

TECHNICAL REPORT NO. 11908

FINAL REPORT

TREAD DESIGN STUDY OF 9.00R20 RADIAL PLY TIRES

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Contract DAAE07-73-C-0242
NATC Project 20-17-30

July 1974

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TREAD DESIGN STUDY OF 9.00R20 RADIAL PLY TIRES



by

James E. Dobbins

TACOM

HODGES TRANSPORTATION INC.

Date: July 1974

Contract DAAE07-73-C-0242

MOBILITY SYSTEMS LABORATORY

U.S. ARMY TANK AUTOMOTIVE COMMAND Warren, Michigan

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INTRODUCTION

Radial ply tire construction has gained considerable recognition over the past five years and has been proven acceptable in a wide field of wheeled vehicle use. The United States Army has used essentially the same tire tread design since before World War II and found the lug type NDCC tire satisfactory for some applications and marginal or unsatisfactory for others. This test program is one of a series of engineering studies being made to determine the characteristics, attributes and shortcomings of currently available commercial radial ply tires in various environments and applications.

From this and other studies, a composite tread design may be developed to more adequately fulfill military tire requirements, improve vehicular mobility and handling in certain problem areas without compromising existing satisfactory operations, and increase useful tire life. There is another radial ply tire advantage which has been demonstrated in previous military wheeled vehicle comparative tire tests: A modest but consistent reduction in fuel consumption.

The test operation was performed at the Nevada Automotive Test Center proving ground in Lyon County, Nevada, the Sand Mountain Test Site in Churchill County, Nevada, and the Winter Test Facility at West Yellowstone, Montana. This test operation was photographed by John Nellenbach of the U. S. Army Tank Automotive Command under the technical direction of Roger Kirk, also of the U. S. Army Automotive Tank Command. Mr. Kirk also provided technical direction to the Nevada Automotive Test Center division of Hodges Transportation, Inc.

FOREWORD

The current non-directional cross-country (NDCC) tread pattern of bias multi-plied tires have been used, with minor improvements, on U.S. Military tactical wheeled vehicles since World War II. It has been a good aggressive tread design, adapted particularly for military truck purposes where off-the-road mobility is an absolute must. The chief drawback to the NDCC and NDMS designs is that they are not good performers over the road. The low percentage (about 55%) of tread rubber in contact with the road surface means poor ground contact (low net to gross footprint), resulting in very poor wet surface traction and braking, and poor lateral stability on turns.

With the advent of steel belted radial ply truck tires, a great advance in tread life, puncture resistance, ground contact area and vehicle handling and stability are possible. Safety is thus enhanced. In addition, radials have fewer plies than bias tires (in the case of large tires, i.e., 10.00-20 and above, far fewer) and thus run much cooler. This means that delaminations and ply separations are much less likely to occur, reducing the incidence of blow-outs. Because

of the steel belt, the full tread, or at least that part equal to the width of the belt, is in contact with the road and tire squirming at the contact patch is practically eliminated. This means lowering the rolling resistance of the vehicle which results in greater drawbar pull for the same expenditure of energy. In other words, a conservation of fuel.

With all these established advantages in radial ply tires, the Army Tank-Automotive Command sought to establish an all-purpose tread design optimized for highway performance which would at least equal, and hopefully surpass, the off-the-road aggressiveness of the NDCC bias tires. A number of commercial radials with variable degrees of aggressive tread designs were procured, and two brands, one domestic and one foreign, were buffed and retreaded with a TACOM approved tread design. These tires, in the 9.00R20 size, were then tested over a comprehensive variety of surface conditions on a M34, 2-1/2 ton truck at the Nevada Automotive Test Center. The results of the tests are disclosed in this report.

ROGER KIRK

Radial Ply Tire Project Engineer U.S. Army Tank-Automotive Command

1.0 TEST OBJECTIVE

The objective of this test program was to conduct an engineering evaluation of eight groups of 9.00R20 radial ply tires, with a variety of tread designs, in order to develop data useful in the design of a military radial ply tire. A contract modification added two different bias ply tires for comparison in several static situations. Tread designs included the standard military NDCC, an experimental USATACOM tread, and several commercial designs for on/off-the-road applications.

2.0 SCOPE OF WORK

The following dynamic response characteristics of the M34 2-1/2 ton 6x6 truck (using single 9.00R20 tires instead of duals on the rear axles) were determined as a function of radial ply tire tread design and inflation pressures on eight groups of radial ply tires:

- a. Lateral stability.
- b. Sand, mud, packed clay, virgin and packed snow, dry ice and wet asphalt tractive force.
- c. Wet asphalt and dry ice braking efficiency.
- d. Sand, mud, packed clay, virgin and packed snow, dry ice and dry asphalt rolling resistance.
- e. Ton mile per hour breaker temperature.
- f. Stone retention and rock cut resistance.

Static analysis of the eight radial ply tire groups plus two bias ply 9.00-20 groups was made in each of the following areas:

- a. Spring rates.
- b. Footprint analysis.
- c. X-rays.

In the prepared sand and prepared mud phases of testing early in the program, the Group A tires were incorrectly mounted. This group has a directionally designed tread pattern and was installed with the tread rotating in the reverse direction. To correct this situation, reruns were made in sand and mud and the results integrated into the Test Result Summary and into each of the related test result sections.

3.0 SUMMARY OF TEST RESULTS

Several methods of tire and tread analyses have been employed to provide discrimination between tire groups.

The most fundamental method is to arbitrarily assign values of 1 through 8 based on tire ranking during the tests as shown in Test Results, page 6. This results in the following ranking:

Rank	Group	Total
1	В	78
2	D	81
	J	81
3	G .	83
ł‡	С	94
. 5	E	98
6	Α	106
7	F	114

See Groups Rating Summary on the following page.

Another method of analysis is based on the following tests:

- 1. "S" turns
- 2. Sand traction
- 3. Mud traction
- 4. Dry Ice traction
- 5. Virgin Snow traction
- 6. Packed Snow traction
- 7. Wet Asphalt braking
- 8. Dry Ice braking
- 9. Rolling resistance sand
- 10. Rolling resistance asphalt

These were selected as being characteristics of mobility, control and handling of major importance to military 2-1/2 ton trucks.

3.0 SUMMARY OF TEST RESULTS (Contd.)

Using the same rating system shown on page 6 but limited to the ten tests listed on page 3 the rating of the eight tire groups is as shown below.

Group				Rating					
& Rank	1	2	3	4	5	6	7	8	Total
D	2	1	2	1	1	2		1	39
E	2	1.	2		1	2	2		40
Α	1	1	1	3	2	1		1	41
G	1	1	3		2	1	1	1	43'
С	1	1	2	1	1	2	1	1	44
В	2	1	1		2	1	3		44
F		3		2	1	1		3	49
J	2		2		1	1	1	3	50

An examination of this rating table shows the D group tire to be superior to the other seven groups. Using the ranking from the table on page 3 the D tire is seen to be just below tire Group B. But tire B ranks significantly lower in the ten listed mobility, control and handling characteristics. An examination of the Group Rating Summary on page 6 shows that Group B is low in sand traction which is an important mobility parameter but high in rolling resistance on packed clay which is not considered as significant and leads to the weighting effect of the table above.

A review of the actual test data shows that all of the tires tested tend to be closely grouped.

The higher ply rating of these eight groups of radial tires, 12 and 14 ply rated, as compared to the 8 ply rated 9.00-20 Non Directional Cross-country bias ply Military Standard tires, (tested in Contract DAAE07-70-C-3338, HTI Project 20-14-32-02), makes direct mobility comparisons of the influence of tread design inappropriate because of the different spring rates and tire deflection characteristics.

3.0 SUMMARY OF TEST RESULTS (Contd.)

It is also noticeable in the tests, on virgin snow and hard pack snow which are directly comparable, that the radial tires are notably superior to the bias tires of Project 20-14-32-02 (DAAE07-70-C-3338) and comparable to the only radial tire (Group A) in the test. The sand data also reflects a superiority for radial tires which was slightly reduced because of wind blown sand that mixed into the test course during the late period of the year when these tests were performed.

Of the three tire groups noted above, A, D and G showed better mobility characteristics than the other groups, none were seriously damaged by rock cutting, and D and G did not show stone retention.

3.0 SUMMARY OF TEST RESULTS (Contd.)

Group Rating Summary

Test Phase	1	2	3	4	5	6	7	8
"J" Turn	G	c	D	J	В	F	A	E
"S" Turn	D	G	E &	J	В	С	A	F
Sand Traction	G	D	J	Α	Е &	F	В 8	С
Mud Traction	J	F	G	Α	В	D	E	С
Dry Ice Traction	В	С	Α	F	D	E	J	G
Virgin Snow Traction	В	F	Е	Α	С	D	G	J
Packed Snow Traction	Α	В	C &	D	J	G	E	F
Wet Asphalt Traction	J	С	D	вε	G	F	E	A
Packed Clay Traction	В	J	G	F	E	Α	С	D
Wet Asphalt Braking	C &	J	В	F	G	Α &	E	D
Dry Ice Braking	E	F	G	D	Α,	B &	С	J
Ton Mile Per Hour	С	D	В	Α	E	Gε	J	F
Stone Retention	В,	С,	D,	G,	J	F	Α	E
Cut Resistance	G	Α	J	В	D	E	С	F
Rolling Resistance Sand	D	E	G	С	Α	J	В	F
Rolling Resistance Mud	J	F	С	E	D	В	G	Α
Rolling Resistance Virgin Snow	J	D	В	G	E	F	A	С
Rolling Resistance Packed Snow	J	G	В	E	F	D	Α	С
Rolling Resistance Packed Clay	E	В	J	Α	G	D	F	С
Rolling Resistance Dry Ice	D	С	В	E	. A	G	F	J
Rolling Resistance Dry Asphalt	E	Α	D	С	G	F	В	J

This summary places each group in relation to other groups based on the ratings for each test phase. "1" is the highest rating, "8" the lowest and where groups are equal they are joined by a comma or an "E" sign.

4.0 CONCLUSION

The TACOM developed re-capped tread design, Group G exhibits above average performance, whereas the same tread design applied to a different tire carcass, Group J, does not perform as well. This confirms that properly applied radial tire technology requires the tread and carcass to be an integral system with interdependent dynamic characteristics. The x-ray study of these two apparently similar tires shows a significant difference in the geometric lay-up of the belt system, (see Appendix II, this report). Tire Group B, a tread design similar to the TACOM design performs better than "J" and not as well as "G".

Group D, which features the same carcass construction as Group G, but a significantly different tread design, exhibits above average performance and is the best of the U. S. original equipment tires tested in this program.

None of the tire groups tested maximize the traction potential of the standard 2 1/2 ton, 6x6 Military truck.

5.0 RECOMMENDATIONS

Design and/or procure a radial ply tire in the 9.00-20 size, having a ply rating equivalent to standard military 9.00-20 NDCC bias ply tires incorporating either the TACOM tread design or one that has tread and shoulder characteristics found most advantageous in this test program.

Conduct a broad series of studies on dynamic capabilities and static properties of this new design relative to the standard military NDCC bias ply tire. These studies to include:

Treadwear and durability characteristics. Tractive ability in various environments. Handling response. Lateral stability. Footprint and spring rate analyses.

TEST RESULTS 5.0

"J" and "S" Turn Measurements

Chart No 1 "J" Turn

Tire Group	Maximum Speed, mph	Differential between front and rear tracks	Control relative to prescribed 90' radius. Rear Wheels
· A	2 9	20.5"	44.0.44
В	. 29	15.0	25.0
C#	30	15.0	40.0**
D	29	11.5	35.5
E	28	12.5	36.0**
F	29	18.5	16.0
G	30	9.0	20.0
J	29	13.5	55.5**
C*	30	11.0	62.0**

Chart No 2 "S" Turn

Tire Group	Maximum Speed, mph	lst Curve Differential between front and rear tracks	2nd Curve Differential between front and rear tracks
Α	27	13.0"	29.0"
В	27	9.5	34.5
C*	27	12.0	14.0***
D	28	13.0	31.0
Ε	28	15.0	29.0
F	27	15.0	27.0
G	28	14.0	24.0
J	28	15.0	27.5
C*	27	12.0	17.0***

*: Control Group ** Loss of control

Severe understeer

Vehicle:

M34 6x6

GVW:

11,536 pounds 4 Wheel drive

Mode:

Chart No.

Dynamic Traction - Dry Sand

Drawbar Pounds

	Inflation Pressure, psig	
Group	10	15
D *	1850	1350
Α	1850	1150
В	177 5	1100
С	1800	1050
E	1750	1200
F	1800	1100
G	2100	1350
J	1950	1150
D	1950	1175

Chart No. 4 shows the ratings in percent of drawbar pounds compared to the Control Group D. This was the only test phase that Group D was used as control. All other test phases use Group C as control. The control was run first and last in this test to determine if course conditions were changing during the test. In the case of dry sand testing, a gradient was established at both inflation pressures and this gradient is reflected in the ratings. (Figures No. 1 through 14).

^{*} Control group

Chart No. 4

Dynamic Traction - Dry Sand

Ratings

Inflation	Pressures,	psig
	,	L C

Group	10	15
D*	100	100
Ą	97	91
В	93	87
С	95	. 83
E	92	95
F	95	87
G · ·	111	107
J	103	91

Track depth and width, cone and plate penetrometer measurements and other data taken on each traction run are included with each traction curve figure. Figures No. 15 through 22 graphically plot the daily course cone and plate penetrometer readings across and down the length of the test course.

Vehicle:

M34

GVW:

11,536 pounds

Mode:

6 Wheel drive

^{*} Control Group

Chart No. 5

Rolling Resistance - Dry Sand

Pounds Per Ton

Inflation Pressure, psig

Group	10	15
D 	141	171
Α	174	190
В	177	220
С	171	183
E	168	180
F	201	234
G	164	190
J	185	203
D	147	178

^{*} Control group

Chart No. 6

Rolling Resistance - Dry Sand

Ratings

	<u>Inflation Pres</u>	sures, psig
Group	10	15
D %	100	100
A	83	92
В	81	80
С	84	96
E	86	97
F	72	75
G	88	92
J	78	86

Chart No. 6 shows the ratings in percent of pounds per ton rolling resistance in dry sand as compared to the control Group D established gradient. (Figures No. 23 and 24).

Vehicle: M34 GVW: 11,536

^{*} Control group

Chart No. 7

Dynamic Traction - Prepared Mud

Drawbar Pounds

Inflation Pressures, psig

Croup	50	35	15
C	1575	1875	2025
A (1)	2475	2200 -	2150
A (2)	1500	2200	2700
В	2050	2000	2050
D	1900	1825	1900
E	1800	1700	2000
F	2300	2325	2625
G	2000	2075	2675
J	2025	2350	2350

^{(1) &}quot;A" Group with directional tread mounted incorrectly.

Chart No. 8 shows the ratings in percent of drawbar pound compared to the control Group C. The control group was run first and last in this test but no course change was recorded (Figures 25 through 34).

^{(2) &}quot;A" Group with directional tread mounted correctly and drawbar pounds interpolated.

Chart No. 8

Dynamic Traction - Prepared Mud

Ratings

Inflation Pressures, psig

Group	50	35	15
С	100	100	100
A (1)	157	117	106
A (2)	95	117	133
В	130	107	101
D	121	99	96
E	114	91	99
F	146	124	130
G	127	106	132
J	129	125	116

^{(1) &}quot;A" Group with directional tread mounted incorrectly.

^{(2) &}quot;A" Group with directional tread mounted correctly and drawbar pounds interpolated.

Chart No. 9

Rolling Resistance - Prepared Mud

Pounds Per Ton

Inflation Pressures, psig

Group	50	35	15
С	277	319	357
Α	308	353	360
В	313	328	331
D ·	322	326	342
Е	266	316	247
F	299	315	335
G	325	334	342
J	285.	295	303

Chart No. 10 shows the ratings in percent of pounds per ton rolling resistance in prepared mud as compared to the control group (Figure No. 35).

Chart No. 10

Rolling Resistance - Prepared Mud

Ratings

Inflation Pressures, psig

Group	50	35	15
. С	100	100	100
Α	89	89	100
В	87	97	107
D .	84	98	104
E	104	100	103
F	92	101	106
G	83	95	104
J	97	108	115

Vehicle: M34 6x6

GVW: 11,536 pounds.

Chart No. 11

Dynamic Traction - Dry Ice

Drawbar Pounds

Inflation Pressures, psig

Group	50	35	15
С	950	1250	1000
Α ΄	1000	900	1050
В	1000	1050	1200
D	7 50	850	1150
E	. 850	925	900
F	800	1050	1000
G	650	750	850
J	600	7 50	1050
С	900	1250	1000

Chart No. 12 shows the ratings in percent of drawbar pounds compared to the control Group C. The control was run first and last in this test to determine if course conditions were changing during the test. In the case of the dry ice testing, a gradient was established for the 50 psig inflation pressure runs. (Figures No. 36 through 45).

Vehicle:

M34 6x6

GVW:

11,536 pounds

Mode:

2 Wheel drive (prop shaft to #3 axle removed)

Chart No. 12

Dynamic Traction - Dry Ice

Ratings

Inflation Pressures, psig

Group	50	35	15
С	100	100	100
A	107	72	105
В	109	84	120
D ·	81	68	115
E	90	74	90
F	87	84	100
G	72	60	85
J	66	60	105

Vehicle: M34 6x6

GVW:

11,536 pounds

Mode:

2 Wheel drive (prop shaft to #3 axle removed)

Chart No. 13

Rolling Resistance - Dry Ice

Inflation Pressure, psig

Drawbar Pounds Per Ton

50 35 15 Group Ç 35 41 62 Α 38 44 64 В 42 36 64 D

 34
 38
 58

 38
 43
 64

 44
 49
 72

 41
 46
 65

 50
 53
 85

Chart No. 14 shows the ratings in percent of pounds per ton rolling resistance on dry ice as compared to the control group C. (Figure No. 46)

Chart No. 14

E

F

G

J

Rolling Resistance - Dry Ice Rating

	Inflation Pressure, psig		
Group		35	_15_
С	100	100	100
Α	92	93	97
В	97	98	97
D	103	108	107
E	92	95	97
F	80	84	86
G	85	. 89	94
J	70	77	73

Vehicle:

M34 6x6

GVW:

11,536 pounds

Chart No. 15

Dynamic Traction - Virgin Snow

Drawbar Pounds

Inflation Pressures, psig

50	35	15
2100	2450	2500
2375	2375	2500
2800	2500	2750
1925	1950	2300
2500	2525	2550
2250	2 600	2850
2150	2050	2100
1850	1850	2175
2325	257 5	2500
	2100 2375 2800 1925 2500 2250 2150 1850	2100 2450 2375 2375 2800 2500 1925 1950 2500 2525 2250 2600 2150 2050 1850 1850

Chart No. 16 shows the ratings in percent of drawbar pounds compared to the control group C. The control was run first and last in this test and a course gradient established. The ratings take into account this course gradient (Figure No. 47) and are adjusted to it.

Chart No. 16

Dynamic Traction - Virgin Snow

Ratings

Inflation Pressures, psig

Group	50	35	15
С	100	100	100
Α	109	97	100
В	132	103	110
D	88	81	108
E	113	105	102
F	100	108	114
G	95	86	8,4
J	81	78	87

Vehicle: TT-6 White Freightliner

GVW: 13,740 pounds Mode: 4 Wheel drive

Chart No. 17

Rolling Resistance - Virgin Snow

Pounds Per Ton

	Inflation Pressure, psig		
Group	50	35	15
С	81	106	127
Α .	91	85	106
В	81	86	91
D	88	85	85
E	88	89	92
F	85	92	96
G	85	86	87
J	69	84	88

Chart No. 18 shows the ratings in percent of pounds per ton rolling resistance in virgin snow as compared to control group C. (Figure No. 57)

Chart No. 18

Rolling Resistance - Virgin Snow

Ratings

Group	Inflation Pressure, psig		
	50	35	15
c	100	100	100
Α	88	119	116
В	100	119	128
D	99	120	133
E	92	116	127
F	91	113	124
G	96	118	131
J	115	121	131

Vehicle:

TT-6 White Freightliner

GVW:

13,740 pounds

Chart No. 19

Dynamic Traction - Hard Packed Snow

Drawbar Pounds

Inflation Pressures, psig

Group	50	35	15
С	2000	2000	2000
Α	2500	2425	2275
В	2175	2150	2100
D	2100	1950	1925
E	2000	1700	1450
F	1875	1725	1575
G	1925	1950	1625
J	1675	1850	1850
С	2200	2150	2125

Chart No. 20 shows the ratings in percent of drawbar pounds compared to the control group C. The control was run first and last in this test and a course gradient established. The ratings take into account this course gradient (Figure No. 58) and are adjusted to it.

Chart No. 20

Dynamic Traction - Hard Packed Snow

Ratings

Inflation Pressures, psig

Group	50	35	15
С	100	100	100
Α	124	120	120
В	106	105	103
D	101	105	94
Е	95	82	70
F	88	82	76
G	90	92	78
J	77	87	87

Vehicle:

TT-6 White Freightliner

GVW:

13,740 pounds

Mode:

4 Wheel drive

Chart No. 21

Rolling Resistance - Packed Snow

Pounds Per Ton

	Inflation Pressure, psig			
Group 50	35	15		
C er	81	89		
Α 49	9 54	80		
В 43	1 44	45		
D 45	5 45	62		
E 45	5 44	44		
F 37	7 45	54		
G 36	5 40	47		
J 3	7 40	43		

Chart No. 22 shows the ratings in percent of drawbar pounds per ton as compared to the control group C. (Figure No. 68)

Chart No. 22

Rolling Resistance - Packed Snow

Ratings

	Inflation Pressure, psig			
Group	50	35	15	
С	100	100	100	
Α	122	134	110	
В	136	146	150	
D	130	145	130	
E	130	146	150	
F	142	144	139	
G	143	150	147	
J	141	150	152	

Vehicle:

TT-6 White Freightliner

GVW:

13,740 pounds

Chart No. 23

Dynamic Traction - Wet Asphalt

Drawbar Pounds

Inflation Pressures, psig			
50	35	_15_	
6500	6500	6500	
6000	5850	5900	
5900	6050	5900	
6175	6400	6500	
6450	6600	6300	
58 7 5	5950	5950	
6175	6400	6050	
6300	6400	6400	
6500	6500	6550	
6500	6500	6500	
	50 6500 6000 5900 6175 6450 5875 6175 6300 6500	50 35 6500 6500 6000 5850 5900 6050 6175 6400 6450 6600 5875 5950 6175 6400 6300 6400 6500 6500	

- (1) Directional tread mounted in designed direction.
 - (2) Directional tread mounted in reverse direction.

Chart No. 24 shows the ratings in percent of drawbar pounds compared to the control group C. The control was run first and last in this test and no course change was recorded. (Figure No.69)

Chart No. 24

Dynamic Traction - Wet Asphalt
Ratings

	Inflation Pressures, psig			
Group	50	35	_15	
С	100	100	100	
A (1)	92	90	91	
A (2)	91	93	91	
В	95	98	100	
D	99	102	97	
E	90	92	92	
F	95	98	93	
G	97	98	98	
J	100	100	101	

- (1) Directional tread mounted in design direction.
- (2) Directional tread mounted in reverse direction.

Vehicle: GVW:

M34 6x6 11,536

Mode:

4 Wheel drive

Chart No. 25

Rolling Resistance - Dry Asphalt

Pounds Per Ton

		5 mph				40 mph	
In	flation	Pressur	e psig	Ir	nflation	Pressure	psig
Grou	<u>ip</u> 50	<u>35</u>	15		50	35	<u>15</u>
С	37	46	61		42	53	65
Α	32	40	47		35	4 5	53
В	42	53	64		54	65	73
D	37	41	48		43	46	55
E	31	39	53		35	44	60
F	45	51	60		53	56	68
G	41	48	55		46	54	60
J	53	61	65		60	66	68

Chart No. 26 shows the ratings in percent of pound per ton rolling resistance on dry asphalt at 5 and 40 miles per hour as compared to control group C. (Figures No. 80 and 81).

Chart No. 26

Rolling Resistance - Dry Asphalt Ratings

		5 mph				40 mph	
Infl	ation	Pressure	e, psig		Inflation	Pressure,	psig
Group	50	35	15		50	35	15
c	100	100	100		100	100	100
Α	114	113	123		83	115	118
В	86	85	95	•	71	77	88
D	100	111	121	*	98	113	115
E	116	115	113		117	117	108
F	78	89	102		74	94	95
G	89	98	110		90	98	108
J	57	67	93		57	7 5	95

Vehicle:

M-104 2 Wheel trailer

GVW:

2978 pounds

Chart No. 27

Dynamic Traction - Packed Clay

Drawbar Pounds

	Inflation Pressure, psig		
Group	50	35	_15
С	3600	4400	4400
Α	3600	4400	4550
В	4000	4750	4750
D	3250	4050	4350
E	3350	4550	4650
F	4000	4350	4250
G	3650	4350	4800
J	4150	4400	4700
С	3600	4400	4400

Chart No. 28 shows the ratings in percent of drawbar pounds compared to the control group C. The control was run first and last in this test and no course change was recorded. (Figure No. 82)

Chart No. 28

Dynamic Traction - Packed Clay Ratings

		In	flation Pressure, p	sig
Group		50	<u>35</u>	15
С		100	100	100
Α		100	100	103
В		111	108	108
D		90	92	99
E		93	103	106
F	9	111	99	97
G		101	99	109
J		115	100	107

Vehicle:

M34 6x6

GVW: Mode: 11,536 pounds

: 4 Wheel drive

Chart No. 29

Rolling Resistance - Hard Packed Clay

Pounds Per Ton

Inflation Pressures, psig

Group	50	35	15
С	48	54	61
Α	43	48	52
B	43	48	49
D	47	50	51
E	40	47	51
F	48	49	53
G	45	49	52
J	40	49	53
С	48	54	61

Chart No. 30 shows the ratings in percent of drawbar pounds per ton as compared to the control group C. The control group was run first and last in this test and no course change was recorded.

Chart No. 30

Rolling Resistance - Hard Packed Clay

Ratings

Inflation Pressures, psig

Group	50	35	15
c	100	100	100
Α	110	111	115
В	110	111	121
D ·	102	107 .	116
E	117	113	116
F	100	109	113
G	106	109	115
J	117	109	113

Vehicle:

M34 6x6

GVW:

11,536 pounds

Chart No. 31 Ton Mile Per Hour Breaker Temperatures

	15 psi Infla	tion	35 psi Inflation	<u>j</u>
	Breaker		Breaker	
Group	Temperature OF	TMPH	Temperature OF	TMPH
Α	217.0	57.07	170.0	57.24
В	204.0	56.68	182.0	56.52
С	189.0	57.02	166.0	57.31
D	203.0	57.14	165.0	57.44
E,	208.0	57.19	184.0	56.98
F	229.5	56.46	199.0	56.03
G	214.0	56.01	180.0	56.80
J	217.0	56.15	177.0	56.76

Figure No. 93 presents the temperatures in graph form.

Braking. Measured distance to stop on dry ice and wet asphalt. Entrance speed for dry ice was 9 miles per hour and for wet asphalt 30 miles per hour. Figures No. 94 and No. 95 display the results in graphic form.

Chart No. 32

Braking

Dry Ice		Wet Ashp	alt	
Group	Avg. Feet	Rating	Avg. Feet	Rating
С	71	100	7 9	100
A	74	100	87	93
В	73	100	. 89	98
D	. 71	104	: 89	92
Е	60	120	90	93
F	65	112	85	96
G	69	108	84	95
J	7 5	95	84	100
С	75	100	85	100

The two figures for group C, the control group, form the course gradient to which all other test groups are compared. Figures No. 94 and No. 95 show the sequence in which the groups were run.

Vehicle: M34 6x6

GVW: 11,536 pounds Mode: 4 Wheel braking

Stone Retention

Groups A, E and F retained stones during this phase of testing.

Groups B, C, D, G and J show no signs of stone retention.

Group E picked up and retained in the tread pattern nine stones in the 3/8" diameter size. Group F retained one of the 3/8" diameter size and Group A retained one each of the 3/8" diameter and 3/4" diameter sizes.

Rock Cutting

Chart No. 33 gives a description of the number and size of cuts incurred during the 1000 mile rock cutting exercise, gives sipe condition where applicable, enlarges on stone retention and points out other significant results to the tread elements and sidewalls.

	Other	Chipping on heel of lugs.	Slight chipping on corners of lugs	Slight chipping on rib edges.	Erosion and chipping on leading edges of shoulder lugs.	Slight chipping on lug edges.	Tearing at the corners of the heel relief grooves and outside lug relief grooves.
	Stone Retention	None	1 - 1/8" and 1 - 3/16" in sipes	None	12 - 1/8" or smaller in sipes	26 - 3/8" to 5/8" diameter stones in tread. Sand particles in all sipes.	None
of Rock Cutting Test	Sipe Condition	No Sines	End tears on 3 sipes	No Sipes	Chipping on edges and end tears on 80%	All Open 17 end tears. Chip- ping severe on edges	No Sipes
Results of	Significant Cuts	8 - 1/4" x 1/8" deen	1 - 1/2" x 1/8" deep 1 - 1" x 1/8" deep 1 - 1 1/2" x 1/8" deep	1 - 1" × 1/8" deep 1 - 1 1/4" × 1/8" deep 16 - 1/4" × 1/8" deep	1 - 1/2" x 1/4" deep 1 - 5/8" x 1/4" deep 1 - 3/4" x 1/8" deep 1 - 1" x 1/4" deep 7 - 3/8" to 1/2" x 1/8" deep	1 - 3/8" x 3/8" deep 1 - 3/4" x 3/16" deep 1 - 3/4" x 1/8" deep 1 - 3/8" x 1/8" deep 1 - 1/4" x 3/16" deep 1 - 1/2" x 3/16" deep 1 - 1/2" x 3/16" deep	<pre>1 - 1 1/2" x 1/4" deep 38 - 3/8" x 1/8" deep 3 - 3/4" x 1/4" deep 94 - chips and cuts approximately 1/4" x 1/16" to 1/8" deep</pre>
Chart No. 33	Sidewall	No Action	No Action	No Action	No Action	No Action .	No Action
	Tire	A	ф	υ .	-32-	្	Į.,

0.9

Results of Rock Cutting Test (Contd.)	
Chart No. 33	

0.9

Other	Chipping on sipe edges.	<pre>1/4" retread left at feathered shoulder area on one side of one</pre>
Stone	13 - 1/16" to 1/8" in sipes.	14 - 1/16" to 1/8" in sipes.
Sipe Condition	<pre>11 - end tears circumferential sipes opened up - radial sipes 0.K.</pre>	All sipes open. Small end tears and some edge chipping.
Significant Cuts	2 - 1/2"x1/8" deep.	24 - 1/4" to 1/2" long by 1/16" to 1/8" deep.
Sidewall	<pre>1-1/4" long to steel 7" from shoulder.</pre>	No action.
Tire Group		ر ب

After each 333 mile increment, the tire groups were rotated to different axle position giving 333 miles in each of the three positions on the test bed. At the conclusion of this test phase, the shore "A" hardness was measured on each test tire and an x-ray of the tread area on one tire from Each two tire group was run for 1000 miles on the NATC imbedded and loose rock Serpentine Course. each group. X-ray prints appear in the Appendix.

tire only.

99	81
99	81
69	82
89	81
99	
89	82
68	80
89	80
Durometer	Ambient Temp. OF
	99 69 89

Shore "A" Hardness Results

	Length x Width Inches	7.40 x 5.90	.05 × 0.	. 7 × 55.	, x		75 \$ 6	· (c	, v	00 × 6.	.20 x 6.	15 x 6	.70 x 6.4	.85 x 6.4	70 × 6.4	.10 x 6	.50 x 6.5	30 × 6.5	.85 x 5.6	x 6.5	$.30 \times 7.3$	9.10 x 6.75	.55 x 7.3	× 7.3	.40 x 5.	45 x 5.	7.	.80 x 6.	•	.84 × 7.
	Weight	1841	1484	2000	2090	2090	1484	1484	1841	2090	2090	2090	1484	1484	1484	2090	2090	2090	1484	1484	1484	2090	2090	2090	1484	1484	1484	2090	2090	2090
1 Width	Infl. psig	50	0 F	T O) m	15	20	35	15	50	35	15	50	35	15	50	35	15	20	35	15	20	35	15	20	35	15	50	35	15
Length and Width	Group	Q					ju)	l					Ĺų				,		တ						ט					
Footprint -	Length x Width Inches	8.76 × 4.79	, ;	9.65 × 5	0.50 × 5	.25 x 7	7.76 x 4.98	8.20 x 5.34	54 x 6.	6	52 x 5.	.50 × 6.	.78 x 5.	.50 x 5.	.75 x 7.	8.85 x 6.27	.30 x 6.	.90 × 7.	.15 x	.20 x 5	9 × 09.	9 X 0	9 × 06.6	12.03 x 6.83	.20 × 4.	.42 x 5.	x 5	.50 x 5.	0.18 x	14.30 x 6.70
34	Weight	1484	1641	2090	2090	2090	1484	1484	1484	2090	2090	2090	1484	1484	1484	2090	2090	2090	1484	1484	1484	2090	2090	2030.	1484	1484	1484	2090	2090	2090
Chart No.	Infl. psig	50) -	20	35	15	50	35	15	50	35	15	20	35	15	20	32	15	50	35	15	20	35	15	20	32	15	20	35	15
	Group	NDCC	ATI'-	ITARY	BIAS		R2A	BIAS					A						Д						ပ					

6.0

Chart No. 35

Length to Width Ratios

Group	Infl. psig	L/W Ratio 1484 Lbs.	Rating	L/W Ratio 2090 Lbs.	Rating
NDCC STD	15	1.80	100	1.85	100
MILITARY	3 5	1.77	100	1.79	100
BIAS	50	1.83	100	1.81	100
R2A	15	1.57	87	1.72	93
BIAS	35	1.54	87	1.61	90
	50	1.56	85	1.57	87
Α	15	1.68	93	1.97	106
	35	1.47	83	1.36	7 6
	50	1.34	73	1.41	78
В	15	1.59	. 88	1.76	95
	3 5	1.40	7 9	1.48	83
	50	1.29	7 0	1.42	7 9
С	15	1.97	109	2.13	115
	35	1.59	90	1.76	98
	50	1.45	7 9	1.60	88
D	15	1.64	86	2.13	115
	3 5	1.28	72	1.39	78
	50	1.25	68	1.26	70
E	15	1.76	98	2.14	116
	3 5	1.35	7 6	1.54	86
	50	1.23	67	1.36	7 5
F	15	1.81	100	2.20	119
	35	1.37	7 6	1.62	91
	50	1.19	65	1.44	80
G	15	1.68	93	2.04	110
	3 5	1.37	77	1.44	80
	50	1.40	76	1.35	7 5
J	15	1.78	99	2.19	118
	35	1.68	95	1.78	100
	50	1.68	92	1.53	85

6.0 TEST RESULTS (Contd.)

Footprints - Spring Rates & Length to Width

Ratios - Rated Against Standard Military NDCC Bias

Chart No.	36	Spri	Spring Rate R	Ratings Pounds/1	Pounds/1	inch Deflection	lection			
Infl. Press. psig	NDCC STD. MIL.	R2A BIAS	A	В	U	Q	ы	[Li	ဗ	רי
50 Improvement %	2125	2500 -18	1750	1750	1500	1750+18	1750	1875	2000	1750
35 Improvement %	1375	2150	1250	1375	1167 +15	1417 -3	1250	1250 +9	1250	1325
15 Improvement %	813	1050	833 -2	950	813	687 +15	700+14	813	792	800

Figures 70 through 79 show the graphic representation of spring rates.

6.0 TEST RESULTS (Contd.)

Chart No.

37 Footprints - Gross and Net Square Inches

Per Per Sq. In.	34.0 56.2 66.3 36.2 56.2	38.5 54.2 71.0 39.1 60.9	32.8 554.8 554.8 35.9 550.2 59.7 59.7 59.7 59.0 71.6	35.2 60.8 71.7 35.5 59.4
Pour Net Area Per Sq. In. Sq.	43.7 26.4 22.4 57.7 37.2	38.6 27.4 20.9 53.4 34.3	45.2 32.9 27.1 58.2 41.6 35.0 27.8 27.8 37.2 29.2	42.2 24.4 20.7 58.9 35.2 29.4
Pounds Per N Sq. In. Gross	21.5 36.3 43.5 22.5 36.1	21.0 30.5 37.1 22.7 34.5	21.1 30.9 38.8 23.3 40.7 40.7 40.9 40.9 43.4	20.4 36.7 45.8 21.3 35.7 44.5
Gross Area Sq. In.	68.9 40.9 34.1 93.1 57.9	70.6 48.7 40.0 92.0 60.6	70.2 48.0 38.3 89.8 61.8 51.4 77.6 47.1 36.3 97.5 62.6	72.9 40.4 32.4 98.1 58.5 47.0
Weight	1484 1484 1484 2090 2090 2090	1484 1484 1484 2090 2090 2090	1484 1484 2090 2090 2090 2090 1484 1484 2090 2090 2090	1484 1484 2090 2090 2090
Infl. psig	35 35 35 35 50	15 35 15 35	115 30 30 30 30 30 30 30 30 30 30 30 30 30	15 35 50 15 35 50
Group	Q	ш	ы	5
g.				
Pounds Per Sq. In. Gr	42.5 67.8 73.8 45.2 71.1 85.3	50.0 71.0 77.3 51.6 74.1 85.0	42.2 60.6 75.0 43.2 78.6 62.9 78.1 43.5 78.1	37.2 58.9 69.7 38.9 59.2 76.8
unds er . In.	34.9 42.5 21.9 67.8 20.1 73.8 46.2 45.2 29.4 71.1 24.5 85.3			699
Area Per Sq. In.	4.9 42 1.9 67 0.1 73 6.2 45 9.4 71	9.7 50. 0.9 71. 9.2 77. 0.5 51. 8.2 74.	5.2 #2. 4.5 60. 9.8 75. 8.4 #3. 2.0 65. 6.6 78. 7.1 #0. 3.6 62. 9.0 78. 8.0 #3. 6.7 78.	3.9 37. 1.3 69. 3.8 38. 5.3 59.
Net Area Per In. Sq. In. Sq. In.	.4 34.9 42 .9 21.9 67 .3 20.1 73 .2 46.2 45 .2 29.4 71	29.7 50. 20.9 71. 19.2 77. 40.5 51. 3 28.2 74.	.7 35.2 42. .8 24.5 60. .9 19.8 75. .0 48.4 43. .3 32.0 65. .9 26.6 78. .5 37.1 40. .5 23.6 62. .6 48.0 43. .6 48.0 43. .6 35.8 58.	.2 39.9 37. .9 25.2 58. .5 21.3 69. .7 53.8 38. .1 35.3 59.
Gross Pounds Pounds Weight Area Per Net Area Per Pounds Sq. In. Sq. In. Sq. In. Gross Net	.9 24.4 34.9 42 .3 40.9 21.9 67 .4 47.3 20.1 73 .9 33.2 46.2 45 .5 42.2 29.4 71 .7 52.6 24.5 85	.3 30.1 29.7 50. .0 43.7 20.9 71. .5 48.7 19.2 77. .5 30.1 40.5 51. .2 44.3 28.2 74. .3 51.9 24.6 85.	8.5 21.7 35.2 42.5 2.4 34.8 24.5 60. 2.4 45.8 19.8 75. 0.8 23.0 48.4 43. 7.6 36.3 32.0 65. 6.6 44.9 26.6 78. 1.0 36.2 23.6 62. 3.6 44.2 19.0 78. 1.6 25.6 48.0 43. 6.5 45.8 26.7 78.	9.0 25.2 39.9 37. 2.3 45.9 25.2 58. 0.6 48.5 21.3 69. 1.4 25.7 53.8 38. 0.8 41.1 35.3 59. 9.7 52.6 27.2 76.
Gross Pounds Area Per Net Area Per Sq. In. Sq. In. Sq. In. Gross Net	60.9 24.4 34.9 42 36.3 40.9 21.9 67 31.4 47.3 20.1 73 82.9 33.2 46.2 45 49.5 42.2 29.4 71 39.7 52.6 24.5 85	49.3 30.1 29.7 50. 34.0 43.7 20.9 71. 35.5 48.7 19.2 77. 69.5 30.1 40.5 51. 47.2 44.3 28.2 74. 40.3 51.9 24.6 85.	68.5 21.7 35.2 42. 42.7 34.8 24.5 60. 32.4 45.8 19.8 75. 90.8 23.0 48.4 43. 57.6 36.3 32.0 65. 46.6 44.9 26.6 78. 41.0 36.2 23.6 62. 33.6 44.2 19.0 78. 81.6 25.6 48.0 43. 60.5 34.6 35.8 58.	59.0 25.2 39.9 37. 32.3 45.9 25.2 58. 30.6 48.5 21.3 69. 81.4 25.7 53.8 38. 50.8 41.1 35.3 59. 39.7 52.6 27.2 76.

7.0 METHODOLOGY

7.1 Lateral stability

"J" and "S" turn maneuvers were used to compare the various construction and tread design capabilities. Diagrams 1 and 2 graphically demonstrate the technique used. The test vehicle enters the test pattern arranged to give a constant radius in the case of "J" turns and two tangent and opposite constant radii in the "S" turn. Vehicle speed is increased in one mile per hour increments until loss of control or full lock steering is achieved. Deviation of front and rear wheels from the test pattern is measured and these measurements plus maximum controlled speed are the criteria for lateral stability.

7.2 Tractive force

A dynamometer vehicle is secured by drawbar or cable to the rear axle of the test vehicle. A constant speed is achieved for each environment and the test vehicle, maintaining constant wheel speed, is brought to zero ground speed and the relationship between wheel speed and ground speed, differential interface velocity, is recorded on a Honeywell XXY plotter. Several test runs are recorded for each inflation pressure in each environment and an average determined. These averages are tabulated in each of the environmental segments in the Test Results section of this report.

7.2.1 Prepared Sand

A level course, 20 feet wide by 500 feet long, was built and harrowed to a depth of approximately 15 inches. On each individual run one inch plate penetrometer and cone penetrometer readings were taken in both rear test tire tracks and in the undisturbed areas outside of the tracks. Track depth and width, vehicle attitude at the end of each run and wheel hop frequency were also recorded. Moisture content to a depth of 18 inches was maintained below .5% and the test course was harrowed after each series of runs.

7.2.2 Prepared Mud

An 18 inch deep course was prepared with a 20-24% moisture content. Track depth and width was measured

7.0 METHODOLOGY (Contd.)

7.2 Tractive force (Contd.)

7.2.2 Prepared Mud (Contd.)

each pass and cone and plate penetrometer readings taken. The course was worked and leveled after each series of runs.

- 7.2.3 Packed clay was run on a course with compaction between 180 and 220+ psi.
- 7.2.4 Virgin snow was run in fresh snow four to six inches deep over a compacted snow area.
- 7.2.5 Packed snow was run on two to four inches of compacted new snow with a compaction of 140 to 200 psi.
- 7.2.6 Dry ice was run on the specially prepared ice surface of the Squaw Valley, California Olympic ice arena. Surface temperature was between 23 and 25°F.
- 7.2.7 Wet asphalt was run on an SAE #5 surface.

7.3 Braking Efficiency

Wet asphalt was run on an SAE #5 surface with an entrance speed of 30 miles per hour. Dry ice braking was run on the same surface as dry ice traction with an entrance speed of 9 miles per hour. Both of these braking tests were run in a 4-wheel braking mode.

- 7.4 All rolling resistance measurements were taken in conjunction with tractive effort testing on the same surfaces and all were run at 5 miles per hour.
- 7.5 Ton Mile Per Hour Breaker Temperature

Each group of tires was run separately using two rear axle tires as the test samples. The test vehicle was run at a constant 35 miles per hour after an initial warm up period. An electric digital temperature recorder was attached to a hand probe and this probe was inserted in the tread shoulder to

7.0 METHODOLOGY (Contd.)

7.5 Ton Mile Per Hour Breaker Temperature (Contd.)

the depth of the belt. Runs were repeated until a stabilized temperature was reached.

7.6 Stone Retention and Rock Cutting

7.6.1 Stone Retention

Three size grades of fractured granite were used for this test; 3/8", 3/4" and 1-1/2". A course was prepared allowing three complete revolutions of the test tire in each size of stone. Three passes at 15 miles per hour were made, recording any retained stones after each pass.

7.6.2 Rock Cutting

Two tires of each of the test groups were run 333 miles in each of the three axle positions over a course of loose and imbedded granite at an average speed of 26 miles per hour. Cuts, tears, abrasions and general tread element conditions were recorded.

7.7 The static tests were conducted as follows:

7.7.1 Spring Rates

The test tire was installed on the rear axle of the test vehicle, a Loadometer platform scale placed under it and the opposite tire raised to create a level contact with the platform scale. Zero was obtained by inserting a sheet of paper under the test tire and raising the tire until the paper could be removed with a slight drag. The tire was lowered onto the scale and the height of a preselected point on the rim measured at each 250 pound increment.

7.7.2 Footprint Analysis

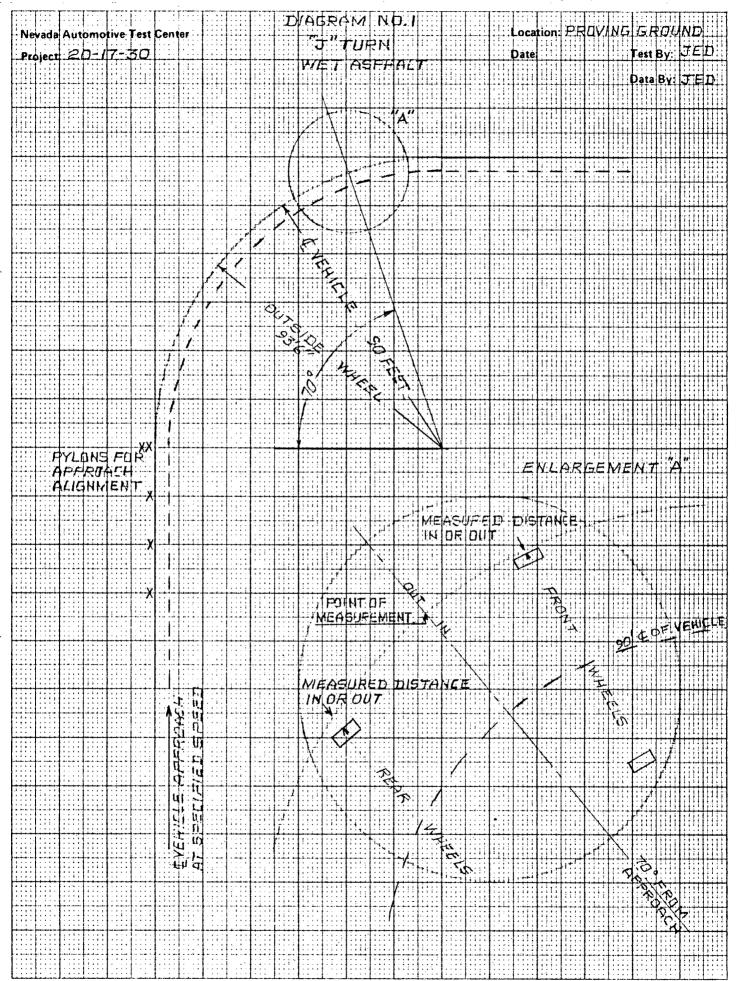
Using the same system as for the spring rate measurements, a section of the test tire tread was covered with printers ink, the tire lowered onto a piece of clean white paper

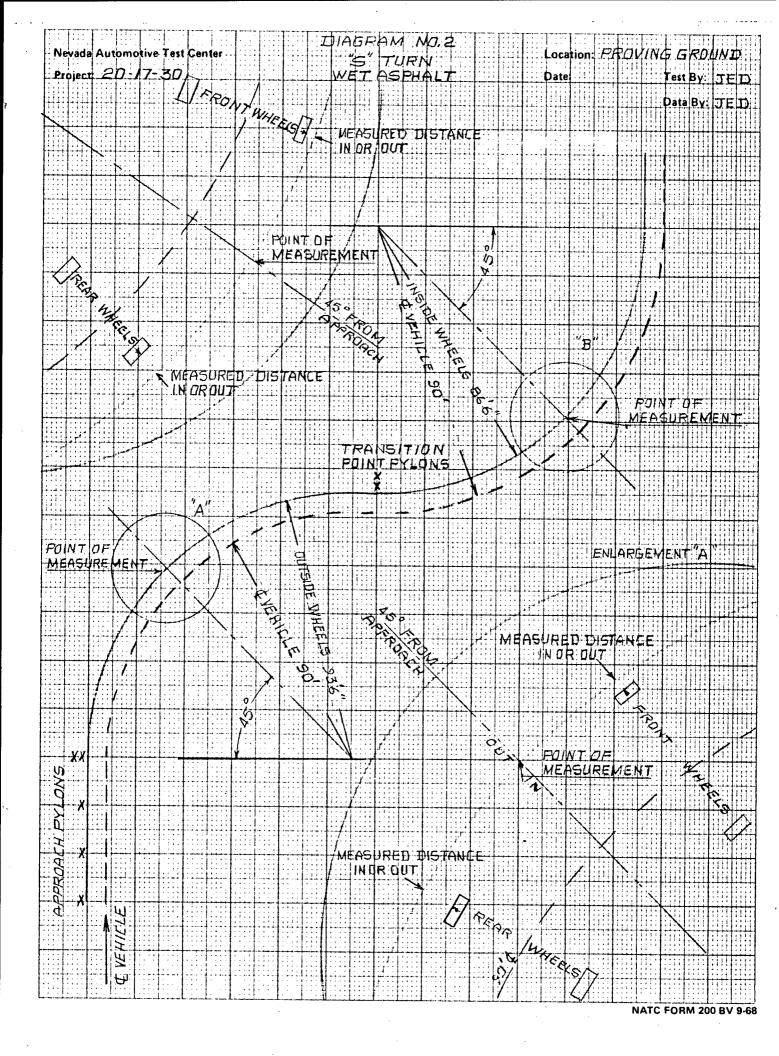
7.0 METHODOLOGY (Contd.)

- 7.7 The static tests were conducted as follows: (Contd.)
 - 7.7.2 Footprint Analysis (Contd.)

to the proper loading, raised and the recorded print removed. The length and width, gross area and net area were measured and recorded.

7.7.3 An x-ray was taken of a section of the tread on one tire from each test group.





8.0 TEST MATERIAL

The dynamic studies of this test project were done on eight groups of 9.00R20 radial ply tires. The static studies were done on the same eight groups plus two groups of 9.00-20 bias ply tires. Each of the radial ply tire groups was given a letter designation which applies throughout this report. Following is a description of these various groups.

Group	Manufacturer	Tread or Construction Designation
Α	Michelin	XL Ply Rating 14
В	Michelin	XB Ply Rating 14
С	Michelin	XY Ply Rating 14
D	Goodyear	Unisteel L-1 Ply Rating 12
Е	Goodrich	Milesaver Radial Steel HDB Ply Rating 12
r	Uniroyal	Max TB-3 Ply Rating 14
G	Goodyear	Unisteel L-1 Carcass with a Lodi retread Ply Rating 12
J	Michelin	XZZ Carcass with a Lodi retread Ply Rating 12

The description of the two additional groups of bias ply tires specified in contract Modification P00003 for static tests is as follows:

Group	Manufacturer	Tread or Construction Designation
Standard Military Bias Ply	Firestone	Non-Directional Cross-Country (NDCC) Ply Rating 8
R2A Bias Ply	Firestone	Military NDCC with circumferential grooves Ply Rating 8

8.0 TEST MATERIAL (Contd.)

Tire Measurements and Weights

•	Group	Outside Diameter At Crown, Inches	Cross Section, Inches	Tread Profile, Inches	Tread Arc Width Inches	Shore "A" Hardness	Unmounted Weight, Pounds
	Α	40.46	10.10	13.25	7.49	68	106.4
	В	40.49	10.17	13.00	7.33	67	104.2
	С	40.20	10.12	12.75	7.30	68	98.1
	· D	40.32	10.30	13.50	7.58	68	108.7
	E	40.15	10.04	14.75	7.01	65	103.5
	F	40.21	9.60	15.25	6.90	7 0	92.8
	G	40.38	10.25	12.75	7.76	68	108.6
	J	40.55	10.20	11.25	7.79	65	100.6
	STD. MIL. BIAS P. NDCC	39.7 9	10.33	7.75	6.00	65	73.3
	R2A BIAS P MODIFI NDCC		10.13	8.75	6.13	68	85.3

9.0 TEST VEHICLE WEIGHT

M34

3 axles

6 wheels

Specified cross-country GVW: For dual rear wheel operation.

Front Axle

5601#

#2 Axle

5587#

#3 Axle

5587#

Specified cross-country GVW: For single rear wheel operation

Front Axle

5601#

#2 Axle

2968#

#3 Axle

2968#

Specified per w for single whee		Actual test loa driver and full	
Right Front	2800.5#	Right Front	2760#
Left Front	2800.5#	Left Front	2765#
#2 Axle Right	1484.0#	#2 Axle Right	1510#
#2 Axle Left	1484.0#	#2 Axle Left	1540#
#3 Axle Right	1484.0#	#3 Axle Right	1490#
#3 Axle Left	1484.0#	#3 Axle Left	1455#
	11,537.0#		11,520#

9.0 TEST VEHICLE WEIGHT (Contd.)

TT-6 White Freightliner

Actual test load with driver and full fuel tank.

Rt. Front 4030 pounds

Lt. Front 4100 pounds

#2 Axle Rt. 1330 pounds

#2 Axle Lt. 1590 pounds

#3 Axle Rt. 1280 pounds

#3 Axle Lt. 1410 pounds

M-104 2 Wheel Trailer

Test loaded to 1484 pounds per tire with 10 pounds tongue weight.

Total GVW 2978 pounds.

Project 20-17-30

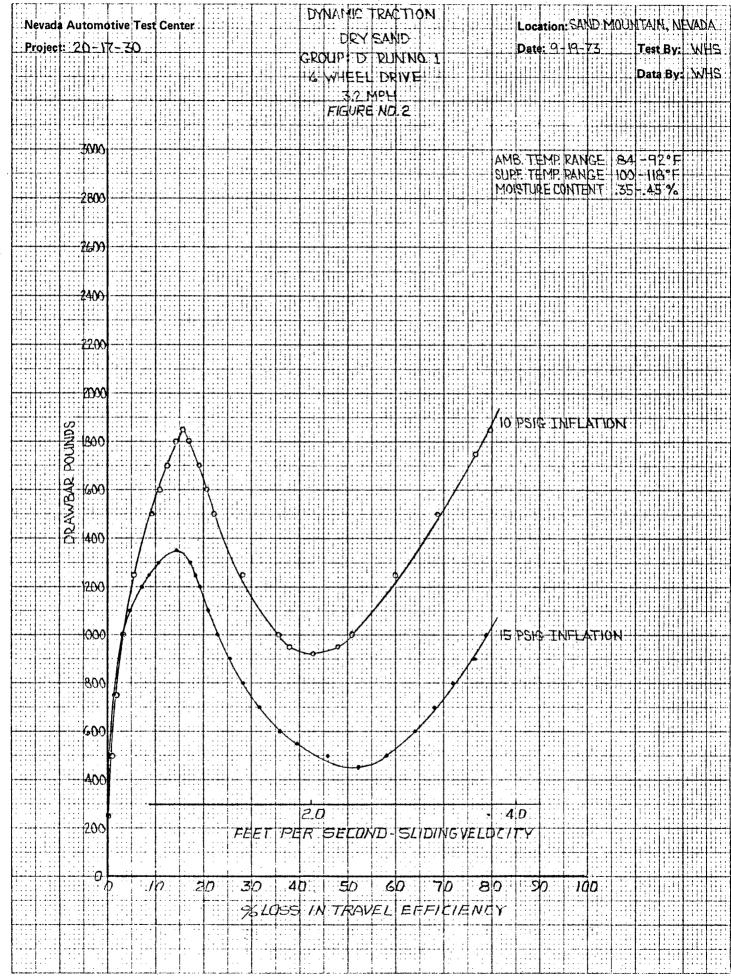
Figure No. 1

Dynamic Traction Summary - Dry Sand

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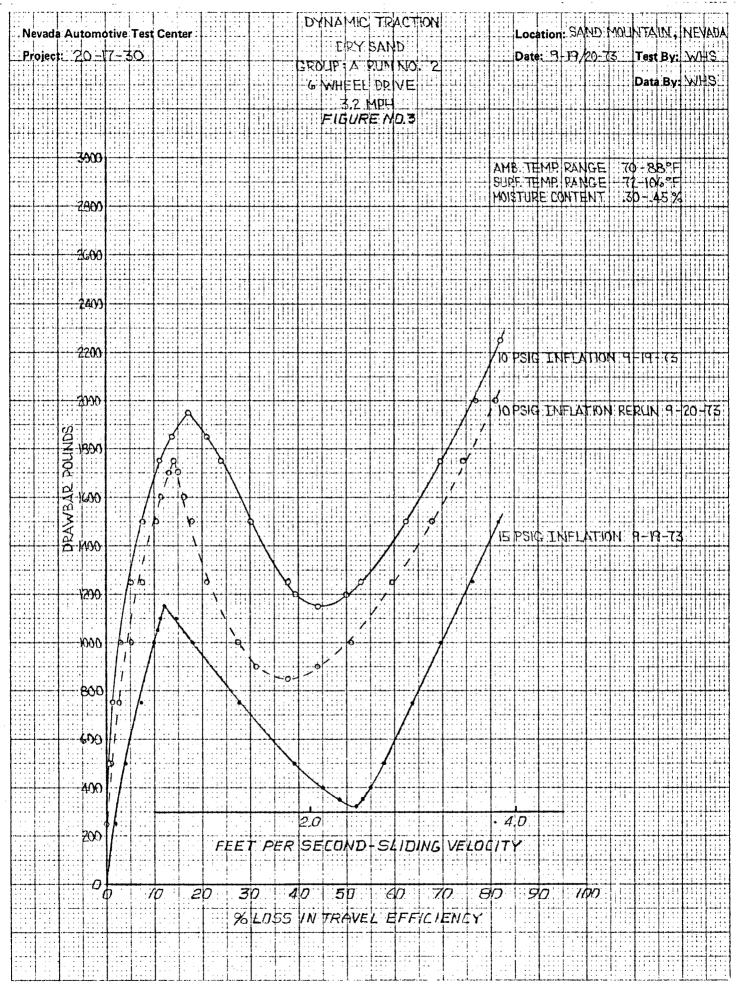
Figures 2 through 10

Dynamic Traction - Dry Sand



Date: 9-19-73 T	ime: 10	145 AM	Tes	t Vehic	le: <u>M-</u>	34	6 WHE	EL DRI	VE	
Vehicle Weight, True	ck: //	,536_ L	BS	Trailer	: NA		Tire Gr	oup:	D	
Inflation, psig: 15	<u> </u>	mbient	Temp.	°F.:_ 9	34	Surface	Temp.	°F.:	100	
Relative Humidity %: 42 Wind Speed, mph: Z Wind Direction: W										
							Sample 3	Depth,	Inches	
Sand Moisture Content, % (at course location): 200 Feet: .40 Feet: .35									.45 .45	
		Left Rear					Right Rear			
Run Number:	•	1	2	3	4	1	2	3	4	
Tire Track Depth, In Tire Track Width, In		3.25		3.75	2.50	3.00	3.25	20,00	3.25 22.50	
Cone Penetrometer Readings in Track	3" 6" 9" 12" 15" 18" 21"	20 55 90 125 05	20 65 85 120 185 05	7.0 55 30 90 145 05	20 60 95 100 08	28 61 70 110 145 05	20 L0 85 105 08	21 55 85 115 05	20 65 90 125 220 06	
Cone Penetrometer Readings in Virgin Sand	3" 6" 9" 12" 15" 18" 21"	20 38 51 70 87 155 05	25 55 45 75 90 215 05	25 45 55 45 75 75 705	25 40 55 60 15 140 05	30 47 60 75 11 88 05	20 25 10 15 100 05	25 45 45 50 185 08	23 65 45 65 65	
Plate Penetrometer Readings in Track, psi	3" 6" 9"	17 45 78	21 57 16	30 60 100	20 55 95	15 67 88	29 54 109	30 52 86	25 49 88	
Cone Penetrometer Readings in Virgin Sand, psi	3 ¹¹ 6 ¹¹ 9 ¹¹	25 60 69	31 62 94	25 41 60		28 49 65	28 62 84	38 50 56	29 42 55	
Test Vehicle Attitu	de at S	Stall, 9	b - Fro	umber: nt Up: nt Down	:		3	4		
Tire Hop Frequency,	Hz	3.0								
Comments:				 						

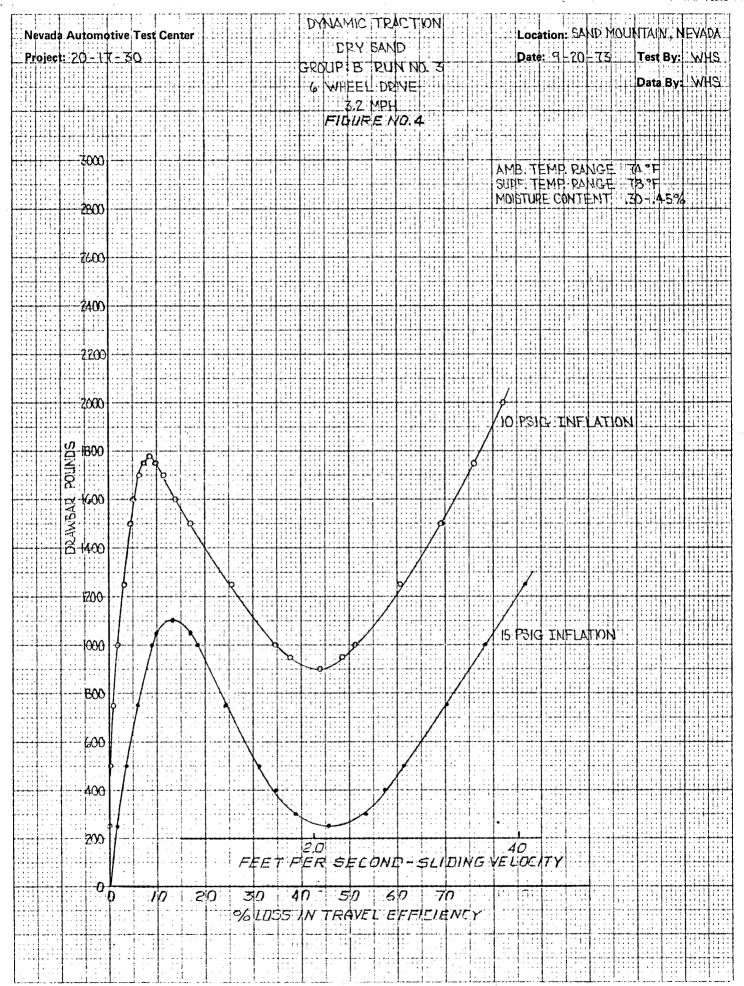
Date: 9-19-73 T	1me:	2:50 PM	Tes	t Vehic.	Le: <u>M</u> -	34	6 WHE	EL DRI	JE
Vehicle Weight, Tru	ck:	1,036 L	.88	Trailer	AN_		Tire Gro	oup:	D
Inflation, psig: <u>\c</u>	>	Ambient	Temp.	of.:	17	Surface	Temp.	۲.: <u>۱</u>	18
Relative Humidity %	:25	W:	ind Spe	ed, mph	: 7	Wind	d Direct	ion:	SW
							Sample 3	Depth,	Inches 18
Sand Moisture Conte	nt, %	(at cour	ese loc	ation):	200 Fee 400 Fee		.40	.35	.45 .45
	Left	Left Rear			Right Rear				
Run Number:	. •	1	2	3	4	1	2	3	4
Tire Track Depth, I Tire Track Width, I		3.75 23.25	4.50 23.00	4.75	5.50 23.50	3,50 23,50	5.00 22.50	4,25	5,00
Cone Penetrometer Readings in Track	3" 6" 9" 12" 15"	30 60 90 175	30 65 90 115 05	15 55 55 105 275	35 15 80 145 08	35 75 35 155 08	30 70 70 145 05	5 55 75 35 175	30 70 95 235 05
	18" 21" 24"			05				<u> </u>	
Cone Penetrometer Readings in Virgin Sand	3" 6" 9" 12" 15" 18" 21"	15 30 35 35 55 245 05	5 15 37 45 75 285 05	5 17 25 15 15 105	35 35 35 45 55 03	33 37 37 35 145 05	20 35 45 45 50 195 65	5 3c 55 50 45 55 285 08	15 20 55 70 80 145 215
Plate Penetrometer Readings in Track, psi	3" 6" 9"	37 52 88	31 55 101	36 51 93	21 48 74	40 57 31	34 65 82	30 71 99	· 34 57 87
Cone Penetrometer Readings in Virgin Sand, psi	3" 6" 9"	23 31 44	_19 _37 _51	727 48 57	75 48 62	25 44 70	23 39 51	22 41 66	23 40 60
Test Vehicle Attitu	de at	Stall,	ီ - Fro	umber: nt Up: nt Down	: 1	1.0	3	4 -	
Tire Hop Frequency,	Hz	7.2	· 						
Comments:									



Date: $9-19-73$ T	ime:	3:00.51	1 Tes	t Vehic	le: <u>M</u> -	34	& MHEE	L DRIV	<u>E</u>		
Vehicle Weight, Tru	ck:	1,536 1	B &	Trailer	:NA	1	Tire Gr	oup:	A		
Inflation, psig: 19	<u> </u>	Ambient	Temp.	°F.:	<i>९</i> ४	Surface	Temp.	°F.:	106		
Relative Humidity %	:38	<u> </u>	ind Spe	ed, mph	: 9	Win	d Direc	tion:	W		
·								Depth,			
Sand Moisture Conte	nt, %	(at cou	rse loc	ation):	200 Fee	t:	3 .45	9 .45	18		
					400 Fee	.40	.40	:45			
			Left	Rear	,		Right	Right Rear			
Run Number:	. •	1	2	3	4	1	2	3	4		
Tire Track Depth, I Tire Track Width, I		3.50 23.00	3.38	3.75	4.75	4.5c 23,50	3.75	3,50 22,00	4.75		
Cone Penetrometer Readings in Track	3" 6" 9"	_10 _50 _30	5 35 75	50	<u>15</u> <u>45</u>	14 55 90	<u> 40</u> <u> 40</u>	10 50 80	15 60 80		
	12" 15" 18"	165 05	140	15 115 280 05	30 110 290	145 290 65	140 255 05	95 275 05	30 81 255 05		
. •	21" 24"				-						
Cone Penetrometer Readings in Virgin Sand	3" 6" 9" 12" 15" 18" 21"	15 40 55 60 60 135 05	15 30 35 37 70 290 05	10 37 60 77 105 7.55 05	20 40 60 70 70 75 790 05	20 32 40 40 40 75 75	5 30 55 40 45 105 290 05	15 30 40 35 35 75 290	40 45 45 45 45 95 05		
Plate Penetrometer Readings in Track, psi	3" 6" 9"	21 68 87	21 53 93	22 56 101	71 51 96	25 55 81	22 61 103	22 57 100	<u>19</u> 57 95		
Cone Penetrometer Readings in Virgin Sand, psi	3" 6" 9"	22 39 58	76 47 59	24 43 69	23 41 66	23 41 60	20 44 61	24 47 68	25 46 64		
Run Number: 1 2 3 4											
Tire Hop Frequency,	Hz	۲.6									
Comments:											

Date: <u>9-19-73</u> T	ime:	4:10 PM	Tes	t Vehic	le: M	1-34 6	WHEEL	DRIVE			
· Vehicle Weight, Trud	ck: <u> </u>	l 536 Li	šs	Trailer	: <u> </u>		Tire Gr	oup: A	<u> </u>		
Inflation, psig: \(\))	Ambient	Temp.	°F.:	38	Surface	Temp.	°F.:	78		
Relative Humidity %	:3\	W:	ind Spe	ed, mph	: 15	Win	d Direc	tion:	W		
Sample Depth, Inche 3 9 18 Sand Moisture Content, % (at course location): 200 Feet: .45 .45 .45 400 Feet: .40 .40 .45											
·	Left Rear							Right Rear			
Run Number:	. •	1	2	3	4	1	2	3	4		
Tire Track Depth, In Tire Track Width, In		3.75	3.13	3.00	4.00	4.25	3,63	3.00	4.50 19.00		
Cone Penetrometer Readings in Track	3" 6" 9" 12" 15" 18" 21"	70 70 90 130 05	\0 \55 \\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	20 60 85 115 205 05	25 45 90 145 06	25 60 74 110 270 05	75 75 110 290 05	75 75 75 725 05	10 70 65 80 210 05		
Cone Penetrometer Readings in Virgin Sand	3" 6" 9" 12" 15" 18" 21"	20 H0 H5 55 85 230 C5	25 50 85 110 135 05	30 45 55 60 60 130	20 37 50 55 80 245 05	25 45 55 80 160 03	10 30 37 40 45 145 285	20 45 60 75 105 05	15 45 80 120 150 255 05		
Plate Penetrometer Readings in Track, psi	3" 6" 9"	25 67 90	28 51 92	59 93	21 66 89	78 111	27 65 92	21 57 88	· 23 67 91		
Cone Penetrometer Readings in Virgin Sand, psi	3" 6" 9"	37 63 69	25 52 54	27 47 64	<u> </u>	32 55 79	24 53 85	<u>75</u> <u>51</u> <u>18</u>	23 49 72		
Test Vehicle Attitu	de at	Stall,	% - Fro	umber: nt Up: nt Down	: <u>c</u> :		3	<u> </u>			
Tire Hop Frequency,	Hz	2.6									
Comments:									!		

Date: 10-20-73 Time: 10:15 AM Test Vehicle: M-34 6 WHEEL DRIVE										
Vehicle Weight, Truck: 11,53% ibs Trailer: NA Tire Group: A										
Inflation, psig: 10 Ambient Temp. °F.: 10 Surface Temp. °F.: 12										
Relative Humidity %: 44 Wind Speed, mph: 9 Wind Direction: WNW										
								Depth,		
Sand Moisture Content, % (at course location): 200 Feet: 35 30 35 400 Feet: 30 30 45										
			Left 1	Rear			Right	Rear		
Run Number:	. •	1	2	3	4	1	2	3	4	
Tire Track Depth, I Tire Track Width, I		6.00 22,50	4.75 23.00	21,50	21.00	5.63	4.25	4.25	6.50 22.00	
Cone Penetrometer Readings in Track	3" 6" 9" 12" 15" 18" 21"	20 55 105 100 215 08	15 45 115 105 05	70 70 115 120 190 05	35 30 90 150 03	15 65 90 90 265 05	20 65 85 105 245 08	10 145 155 105 245 05	30 60 80 85 175 05	
Cone Penetrometer Readings in Virgin Sand	3" 6" 9" 12" 15" 18" 21"	10 25 85 70 75 130 08	70 35 50 50 50 195 03	.5 25 85 45 45 230 08	15 40 45 75 95 05	10 25 75 40 35 225 05	15 35 60 50 45 755 05	20. 60. 50. 45. 50. 95. 05.	\$0 45 55 65 80 185 05	
Plate Penetrometer Readings in Track, psi	3" 6" 9"	27 59 98	74 52 94	21 52 76	31 56 97	27 63 95	72	24 51 93	<u>27</u> <u>68</u>	
Cone Penetrometer Readings in Virgin Sand, psi	3" 6" 9"	27 41 66	25 39 54	7.9 48 64	27 <u>45</u> 57	22 35 51	31 51 55	21 40 62	19 48 71	
Test Vehicle Attitu	de at S	Stall, ⁹	% - Fro	umber: nt Up: nt Down	: 1.5	2	<u>3</u> <u>-</u> -	1.5		
Tire Hop Frequency,	Hz	7.6								
Comments:										

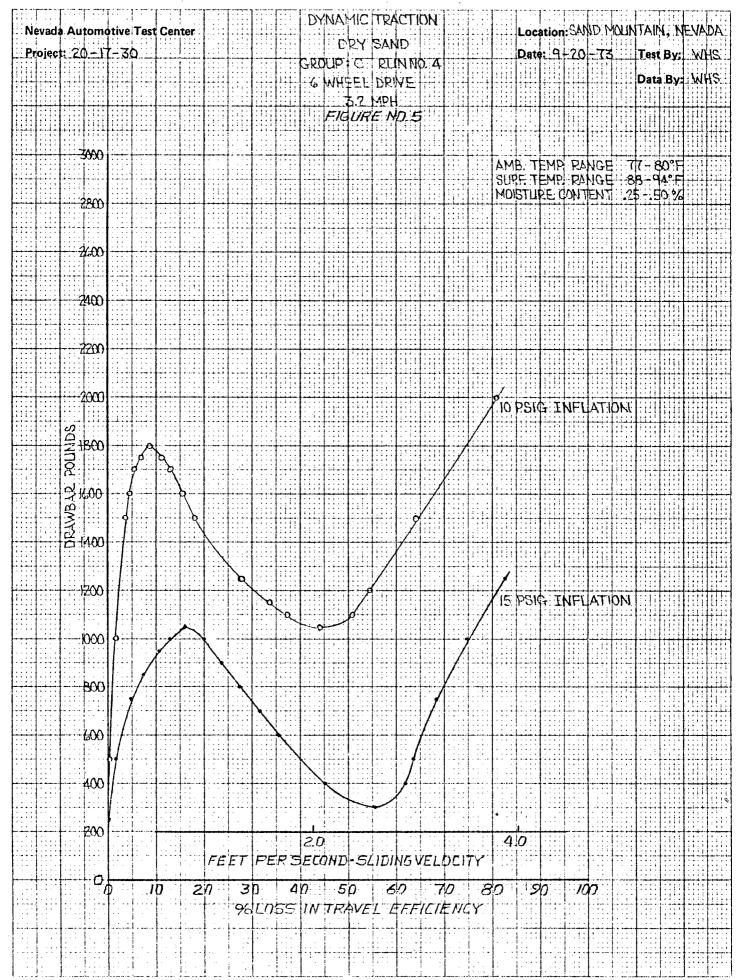


duaz psid

Date: 9-20-73 Time: 10:50 AM Test Vehicle: M-34 6 WHEEL DRIVE													
Vehicle Weight, Tru	ck: <u> </u>	536 LT	BS '	Trailer	<u>AU</u> :		Tire Gr	oup:	В				
Inflation, psig: 15	5	Ambient	Temp.	°F.:	74	Surface	Temp.	°F.:	78				
Relative Humidity %	Relative Humidity %: 44 Wind Speed, mph: 7 Wind Direction: W												
			•				Sample 3	Depth,	Inches 18				
Sand Moisture Conte	nt, %	(at cou	rse loc	ation):	200 Fee 400 Fee		,35	.30	.35				
	·		Left	Rear			Right :	Rear					
Run Number:		1	2	3	4	1	2	3	4				
Tire Track Depth, I Tire Track Width, I		4.75	3.15 24.00	3.50	3.75 24.00	4.50	3,15 24,50	3.00 23.00	3,00				
Cone Penetrometer Readings in Track	3" 6" 9" 12"	10 145 135	15 10 120 165	13 40 75 130	100 100 10	10 11 135 130	20 55 105 145	15 65 95 125	5 35 130 130				
	15" 18" 21" 24"	05	<u> </u>	285	135 05		<u> </u>	275 05 	245 05				
Cone Penetrometer Readings in Virgin Sand	3" 6" 9" 12" 15" 18" 21"	10 25 65 45 55 290 03	10 20 35 60 65 105	13 25 30 40 40 105 65	10 50 65 70 75 765 03	5 20 70 65 80 240 65	10 35 80 55 55 190 05	25 35 35 45 55 290 05	20 40 45 55 55 240 05				
Plate Penetrometer Readings in Track, psi	3" 6" 9"	21 50 100	24 50 100	110 -18 -18	18 48	23 59 100	24 54 95	15 59 100	· 19 · 42 · 97				
Cone Penetrometer Readings in Virgin Sand, psi	3'' 6'' 9''	24 46 54	16 38 56	74 50 76	22 50 70	22 41 54	20 46 62	_18 _58 _76	25 55 70				
Test Vehicle Attitu	de at	Stall,	% - Fro	umber: nt Up: nt Down	: 015	2 	3	1,0	- ,				
Tire Hop Frequency,	Hz	3.0											
Comments:													

Vehicle Weight, Truc Inflation, psig: \(\chi_0	<u> </u>	Ambient		Trailer		Surface	Tire Greater Temp.	_	B 78
Relative Humidity %	44	W:	ind Spe	ed, mph	::	Win	d Direc	tion:	W
								Depth,	
Cand Majatuma Camta	. L Q	(1		200 5		3_	9	18
Sand Moisture Conter	1t, 6	(at cou	rse loc	ation):	400 Fee		<u>• 35</u>	.30	.35
					400 166		.30	• 30	.45
			Left	Rear			Right	Rear	
Run Number:	. •	1	2	3	Įţ.	1	2	3	4
Tire Track Depth, In		3,75	3.75	4.00	3.50	4.25	3.15	3.75	3.50
Tire Track Width, In	ns.:	20.00	18.00	20.00	19.50	20.00	19.00	10.00	18.50
Cone Penetrometer	.311	15	10	20	15	20	15	2.5	20
Readings in Track	6"	85	55	75	<u> 65</u>	65	70	70	<u> </u>
	9"	30	80	105	85	70	35	110	95
	12"	80	95	115	90	90	105	105	125
	15"	215	175	175	155	215	175	175	240
•	18"	05	05	05	०६	05	05	05	05
	21"	~	-		~				
	24"				~				
Cone Penetrometer	3"	15	10	10	10	10	12	25	20
Readings in	6"	<u>50</u>	55	35	45	<u>30</u>	45	70	35
Virgin Sand	9"	75	<u>55</u>	70	<u>65</u>	<u>55</u>	55	80	50
	12" 15"	90	<u>65</u>	95		. 50	55	85	80
	18"	115	90	115	85	35	60	140	85
	21"	135	<u> </u>	<u> </u>	275	75	<u> 265</u>	255	95
	24"	08			05	135	05	05	140
	2 - 1					05			245
Plate Penetrometer	3"	.51	21	·20	21	23_	.58	2.3	28
Readings in Track,	6"	50	53	55	5 2.	61	64	49	74
psi	9"	84	83	48	OF	102	85	90	96

Cone Penetrometer	3"	23	25	10	24	23	<u> </u>	32.	27
Readings in	6"	39	45	44	55	52	54	61	55
Virgin Sand, psi	9"	11	58	79	81	_55	65	74	78
			5 17	•		_	•		
mane 17alia3. Aeeie		C+-11 5		umber:	1	2	3		-
Test Vehicle Attitud	de at	Starr,		nt Op: nt Down					
			11.0	iic howii	: 1.0	1.0	1.0	1.5	
Tire Hop Frequency,	Hz_	2.5							
	-								



Date: <u>9-20-73</u> T Vehicle Weight, Tru	ime: ck:	1:15 PM 11,536 L		t Vehic Trailer		1-34	Tire Gr	oup:	C
Inflation, psig: 15	5	Ambient	Temp.	°F.:	17	Surface	Temp.	°F.:	९९
Relative Humidity %	57	Wi	ind Spe	ed, mph	::	Win	d Direc	tion:	WNW
·							Sample 3	Depth,	Inches
Sand Moisture Conte	nt, %	(at cour	ese loc	ation):	200 Fee 400 Fee		. 25	140	,45
			Left	Rear			Right	Rear	
Run Number:	. •	1	2	3	4	1	2	3	4
Tire Track Depth, I Tire Track Width, I		4.25	4,00 23.00	3.50 22.00	4.25 23.00	4,50	2.4.00	4.00	4.25 23.50
Cone Penetrometer Readings in Track	3" 6" 9" 12" 15"	15 55 130 135	25 85 105 190	75 75 105 175	10 40 150 140	75 105 155	25 55 110 175	110 145	15 45 125 105
	18" 21" 24"	No.			0.3				To any
Cone Penetrometer Readings in Virgin Sand	3" 6" 9" 12" 15" 18" 21"	10 40 60 65 135 05	10 50 45 45 45 65 265 265	20 40 50 45 65 05	10 55 50 45 45 235 05	10 45 50 50 55 240 05	10 25 50 50 145 05	10 45 60 60 70 225 05	26 55 50 50 \20 05
Plate Penetrometer Readings in Track, psi	3" 6" 9"	22 56 106	20 46 82	22 52 102	21 51 92	22 54 103	21 51 96	25 55 94	· 20 53 110
Cone Penetrometer Readings in Virgin Sand, psi	3" 6" 9"	22 46 61	7.2 41 54	27 39 54	23 37 55	21 42 62	32 36 38	26 46 61	27 49 64
Test Vehicle Attitu	de at	Stall, %	t - Fro	umber: nt Up: nt Down	: <u>o, s</u>	2	3	1.5	-
Tire Hop Frequency,	Hz_	2,9			•	•			•
Comments:							-		

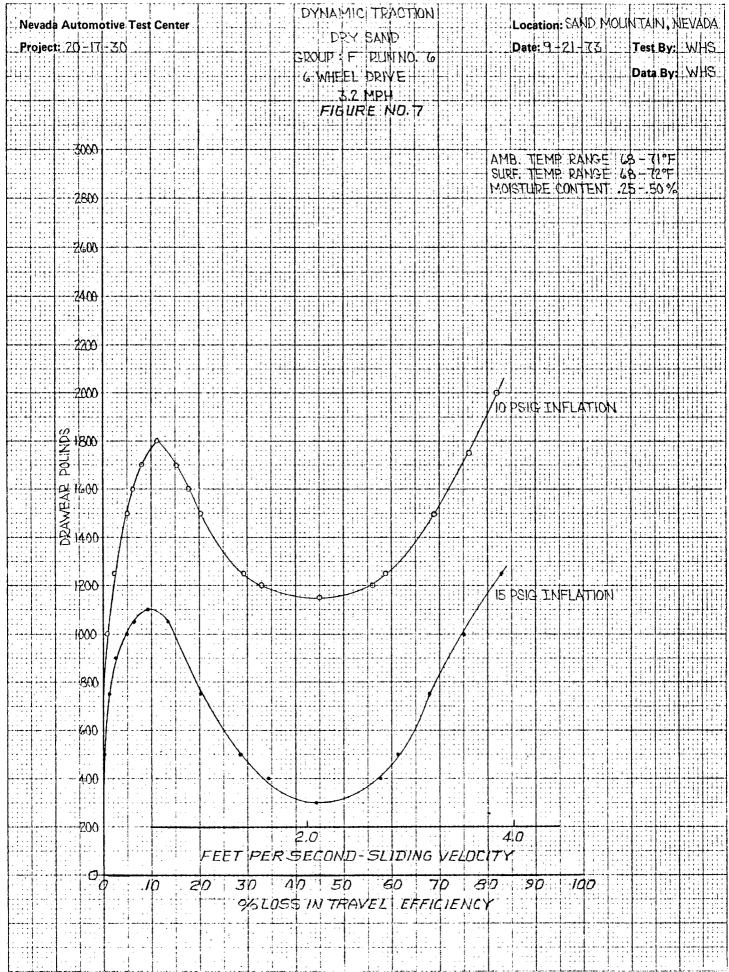
Date: 9-20-73 Time: 1:45 PM Test Vehicle: N-34 & WHEEL DRIVE													
Vehicle Weight, Truck: 11,536 LBS Trailer: NA Tire Group: C													
Inflation, psig: N	<u> </u>	Ambient	Temp.	°F.:	80	Surface	Temp.	°F.:	<u>94</u>				
Relative Humidity %: 48 Wind Speed, mph: 15 Wind Direction: W													
Sample Depth, Inches 3 9 18 Sand Moisture Content, % (at course location): 200 Feet: .25 .40 .45 400 Feet: .35 .40 .50													
			Left H	?aan			Right		, 55				
Run Number:		1	2	3	Ţţ.	1	2	3	4				
Tire Track Depth, In Tire Track Width, In		4.25	3.75	4.50 18.50	3.00 16.50	4.25 20.50	3.75	4.25	4.50				
Cone Penetrometer Readings in Track	3" 6" 9" 12" 15" 18" 21"	20 50 85 110 205 08	10 65 80 135 05	20 35 75 100 280 05	2.0 80 110 110 145 05	5 25 125 125 220 65	20 55 90 100 715 05	20 50 100 140 130 05	10 75 80 95 160 05				
Cone Penetrometer Readings in Virgin Sand	3" 6" 9" 12" 15" 18" 21"	10 10 15 110 240 05	5 55 60 15 105 03	20 50 70 90 120 290 05	15 45 60 60 55 155 05	15 30 До 35 35 190 cs	10 45 45 40 30 205 08	10 50 60 80 95 170 290 08	10 65 80 100 210 05				
Plate Penetrometer Readings in Track, psi	3" 6" 9"	24 49 83	18 42 72	2i. 57. 86	24 55 96	7.3 40 98	725 44 104	16 49 92	12 L				
Cone Penetrometer Readings in Virgin Sand, psi	3" 6" 9"	15 41 68	76 52 68	123 14 Sb	2.4 50 55	2.1 40 45	-70 -46 59	76 57 68	75 57 77				
Test Vehicle Attitud	de at 9	Stall, %			$\vdots \frac{1}{\frac{c}{c \cdot 5}}$	2	3 	1.0					
Tire Hop Frequency,	Tire Hop Frequency, Hz 2.5												
Comments:								-					

Nevada Automotive	Test C	enter					DY	1	1111	TR SAN		1011				i	1141	2.1.	11:1:	1:11	ITAI	Ν. Ι	1 .::	DA
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Date: <u>9-20-73</u> T	ime:	2:40P1	<u>ч</u> Tes	t Vehic	le: <u>M-</u>	34 C	WHEE	L DRIV	E				
Vehicle Weight, Truck: 11,536 LBS Trailer: NA Tire Group: E													
Inflation, psig:	<u>5</u> ,	Ambient	Temp.	°F.:	80	Surface	Temp.	°F.:	14				
Relative Humidity %: 48 Wind Speed, mph: 15 Wind Direction: W													
Sample Depth, Inches 3 9 18 Sand Moisture Content, % (at course location): 200 Feet: 125 40 45 400 Feet: 135 40 50													
			Left	Rear			Right :	Rear					
Left Rear Right Rear Run Number: 1 2 3 4 1 2 3 4													
Tire Track Depth, I Tire Track Width, I		3.75	3.50	4 25 22.50	3.50 21.50	4.25	4.25	4.25	4.25				
Cone Penetrometer Readings in Track	3" 6" 9" 12" 15" 18" 21"	10 30 100 135 05	10 70 90 135 05	25 75 110 140 c5	10 50 95 145 08	10 40 150 125 290 05	15 50 90 160 05	20 10 100 135 285 05	75 110 125 05				
Cone Penetrometer Readings in Virgin Sand	3" 6" 9" 12" 15" 18" 21"	5 50 55 50 50 280 0\$	15 40 55 50 45 285 05	7.0 50 60 55 55 7.35 05	15 50 70 70 90 05	15 HO 65 165 Z65 OS	20 50 65 110 05	20 50 70 80 135 280 05	15 40 55 55 80 285 05				
Plate Penetrometer Readings in Track, psi	3" 6" 9"	21 48 98	22 52 102	25 53 101	24 55 99	21 51 105	51 101	25 61 101	25 52 110				
Cone Penetrometer Readings in Virgin Sand, psi	3" 6" 9"	. FP . FP	24 48 60	28 49 65	25 50 66	19 32 57	76 48	18 55 80	26 43 66				
Test Vehicle Attitu	de at :	Stall, ^s	- Fro	umber: nt Up: nt Down	: 1	2	3	1.0	<u>-</u>				
Tire Hop Frequency,	Hz_	7.8				•							
Comments:													
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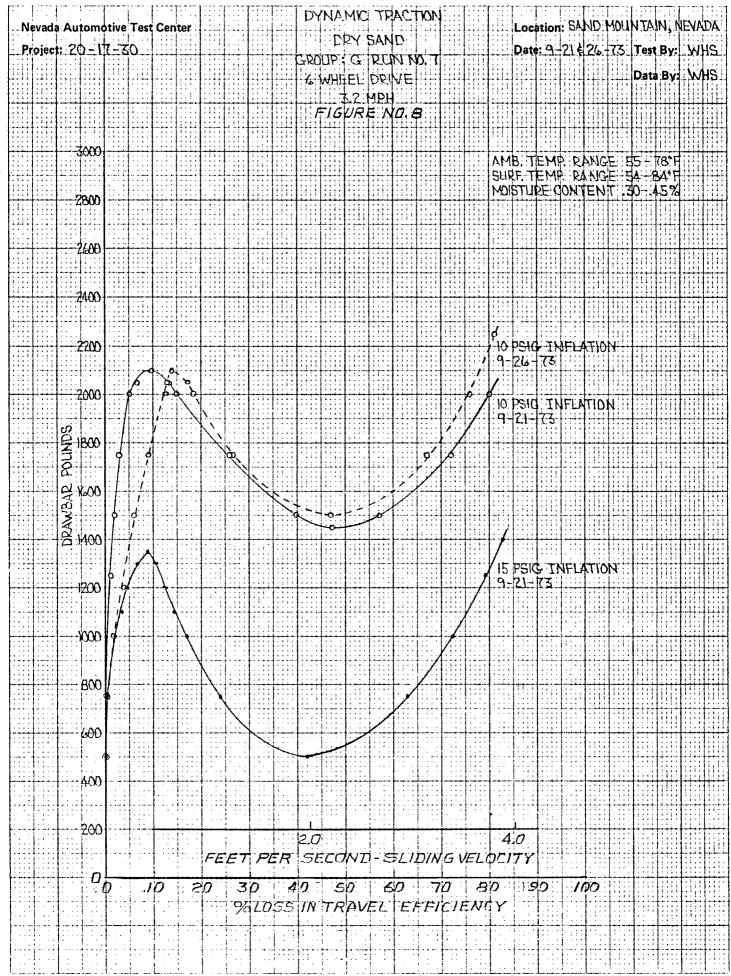
Date: 9-21-73 Time: 9:15 AM Test Vehicle: M-34 LWHEEL DRIVE											
Vehicle Weight, True	ck:	l, 536 l	BS	Trailer	: NA		Tire Gr	oup:	E		
Inflation, psig: 15	5	Ambient	Temp.	PF.: 5	55 \$	Surface	Temp.	°F.:	5 4		
Relative Humidity %	51	W:	ind Spe	ed, mph	:	Win	d Direc	tion:	SW		
					•		-	Depth,			
Sand Moisture Conte	nt, %	(at cour	rse loca	ation):	200 Feet 400 Feet	*	3 , 25 , 50	9 .35	18 .35 .35		
			Left I	Rear			Right :	Rear			
Run Number:		1	2	3	4	1	2	3	4		
Tire Track Depth, In Tire Track Width, In		4.50 22.50	5.50 23.00	4.75	4.75 24.00	<u>4.75</u> 23.00	5.00 24.00	4,50	4.39		
Cone Penetrometer Readings in Track	3" 6" 9"	20 65 100	15 60 110	95 95	10 55 100	25 75 95	20 85 105	15 95 105	20 55 90		
	12" 15" 18" 21"	105 245 05	145 08	105 05	290 05	105 765 05	135 290 05	125	265 05		
	24"										
Cone Penetrometer Readings in Virgin Sand	3" 6" 9"	20 45 60	15 35 50	20 45 65	15 35 55	50 50	7.0 40 5.5	10 55 55	15 25 40		
,	12" 15" 18"	<u>65</u> 65 165	55 65	70 75 290	75 180	70 115	60 60 115	70 85 225	50 50 190		
	21" 24"	05	20	<u>0</u> 5	295 05	270 05	240	05	05		
Plate Penetrometer	3" 6"	25	24_	21	24	27	7.5	76	<u> 25</u>		
Readings in Track, psi	9"	<u> </u>	91	104	<u>66</u> 95	104	101	<u>101</u> 90	<u>70</u> 110		
Cone Penetrometer Readings in Virgin Sand, psi	3" 6" 9"		<u>-20</u>	38	<u>24</u> 45	72 <u>43</u>	<u>Z1</u> <u>41</u>	<u>24</u> <u>44</u>	<u> 28</u> <u>43</u>		
Test Vehicle Attitud	de at	Stall,			<u>1</u>	2	3	<u> </u>	<u>-</u> -		
Tire Hop Frequency,	Hz_	3.0									
Comments:		,			 						

Vehicle Weight, Truck: 11 536 LBS Trailer: NA Tire Group: E													
Inflation, psig: 10 Ambient Temp. °F.: 68 Surface Temp. °F.: 68													
Relative Humidity %: 59 Wind Speed, mph: 4. Wind Direction: E													
Sample Depth, Inches 3 9 18													
Sand Moisture Content, % (at course location): 200 Feet: 3 9 18 400 Feet: .25 .35 .35 400 Feet: .50 .35 .35													
Left Rear Right Rear													
Run Number: 1 2 3 4 1 2 3 4													
Tire Track Depth, Ins.: 4.75 4.50 4.50 5.50 4.25 5.00 4.50 5.50 Tire Track Width, Ins.: 21.50 19.50 19.00 22.00 19.50 18.50 22.50													
Cone Penetrometer 3" 10 15 10 25 30 10 20 25 Readings in Track 6" 40 55 30 70 80 45 90 65 9" 130 45 90 90 90 95 90 90 90 95 85 80 12" 100 105 95 90 90 90 90 95 150 15" 160 290 240 05 245 290 215 05 18" 05 05 05 - 05 05 05 -<													
Cone Penetrometer 3" 30 20 15 20 20 15 25 10 Readings in 6" \$5 40 45 35 50 50 50 30 Virgin Sand 9" \$5 45 65 35 10 100 75 50 12" 60 40 40 45 90 105 95 50 15" 95 85 95 100 105 150 165 60 18" 235 210 165 65 280 05 65 200 21" 65 65 65 7 65 7 65 7													
Plate Penetrometer 3" ZL Zl Z4 32 Z8 Z8 Z5 27 Readings in Track, 6" 59 Lo L4 54 5L L3 L8 71 psi 9" 88 90 94 101 98 88 89 91													
Cone Penetrometer 3" Z8 Z9 Z4 ZZ Z1 Z9 30 Z1 Readings in 6" 56 42 46 46 56 53 61 38 Virgin Sand, psi 9" 65 55 68 64 71 84 78 49													
Run Number: 1 2 3 4 Test Vehicle Attitude at Stall, % - Front Up: - - - - Front Down: 0.5 1.0 1.0 1.0													
Tire Hop Frequency, Hz z.8													
Comments:													



Date: 1-21-73 T	ime: 10	:50 AM	1 Tes	t Vehic	le: <u> </u>	1-34	6 WH	EEL DE	IVE
Vehicle Weight, True	ck: <u>11</u>	536 LB	<u>s</u> '	Trailer	: <u>NA</u>	·	Tire Gr	oup:	F
Inflation, psig: is	<u> </u>	mbient	Temp.	°F.:	<i>68</i>	Surface	Temp.	°F.:	68
Relative Humidity %	:59	W i	ind Spe	ed, mph	: <u>lo</u>	Win	d Direc	tion:	E
Sand Moisture Conte	nt, % (at cour	rse loca	ation):	200 Fee		Sample 3 .25 .50	Depth, 9 .35	18 -35 -35
D 11			Left 1			***************************************	Right 1		1,
Run Number:		1	2	3	4	<u></u>	2	3	4
Tire Track Depth, In Tire Track Width, In		4.75 22.00	4.15 22.00	5.00 21.50	5.00 22.00	5.13 23.00	5.00 22.00	24.50	5,50 22,50
Cone Penetrometer Readings in Track	3" 6" 9" 12" 15" 18" 21"	10 70 95 150 290 06	10 15 105 145 05	20 70 13c 200 05	20 60 110 140 05	10 50 90 125 265 05	20 45 115 165 05	15 45 130 135 05	15 75 110 140 0\$
Cone Penetrometer Readings in Virgin Sand	3" 6" 9" 12" 15" 18" 21"	30 35 35 30 160 05	10 40 50 50 10 245 05	20 30 35 35 30 290 05	30 35 30 35 30 35 230 05	15 40 45 45 125 05	10 140 55 40 90 275 05	15 40 70 55 195 05	10 40 45 40 50 05
Plate Penetrometer Readings in Track, psi	3" 6" 9"	75 58 103	22 6,2 101	25 56 104	27 57 101	101	21 54 108	25 57 92	22 61 101
Cone Penetrometer Readings in Virgin Sand, psi	3" 6" 9" .	71 38 47	22 32 48	24 36 42	22 34 39	35 46 58	22 38 43	30 41 57	77 36 42
Test Vehicle Attitud	de at S	stall, 9	- Fro	umber: nt Up: nt Down	: 1.5	2	3 	1,5	
Tire Hop Frequency,	Hz	3.2							
Comments:									

Date: 1-21-73 T	ıme: <u>/</u>	1:20 AM	Tes	t Vehic.	le: <u>M</u>	<u>- 34 (</u>	, WHEE	DRIVE				
Vehicle Weight, Truck: 11,536 LBS Trailer: NA Tire Group: F												
Inflation, psig: N	<u>0</u>	Ambient	Temp.	PF.:	11	Surface	Temp.	°F.:	72			
Relative Humidity %: 40 Wind Speed, mph: Wind Direction: E												
Sand Moisture Conte	nt, %	(at cou	rse loca	ation):	200 Fee		Sample 3 .25 .50	Depth, 9 .35 .35	Inches 18 .35 .35			
			1 . E+ 1)		•	Dinks 1	0				
Run Number:		1	Left I	kear 3	4	1	Right 1	Kear 3	4			
Tire Track Depth, I Tire Track Width, I		4.50 17.00	<u>4.50</u> 18.75	<u>4.75</u> 18.00	<u>4.50</u> 18:50	11.50	<u>4.50</u> 17.00	<u>4.15</u> 18.00	3.75 16.00			
Cone Penetrometer Readings in Track	3" 6" 9" 12" 15" 18" 21"	10 35 90 195 05	20 55 70 90 280 05	15 60 70 (10 265 05	15 15 85 95 230 0%	20 90 95 135 225 06	25 30 95 95 95 95	15 55 125 90 165 06	10 75 85 90 215 05			
Cone Penetrometer Readings in Virgin Sand	3" 6" 9" 12" 15" 18" 21"	15 50 75 95 145 05	10 35 75 90 115 05	20 45 65 75 90 215 00	10 45 65 75 100 05	20 70 95 100 100 90 135 05	15 45 45 40 70 70 235 05		15 50 90 90 110 200 210 05			
Plate Penetrometer Readings in Track, psi	3" 6" 9"	26 62 101	27 <u>L3</u> 81	76 62 100	25 59 92	-26 -71 -85	31 66 84	31 78 88	21 65 97			
Cone Penetrometer Readings in Virgin Sand, psi	3" 6" 9"	26 49 74	<u> 24</u> <u> </u>		32 55 82	<u>36</u> <u>88</u> 	39 55 77	77 54 72	32 57 79			
Test Vehicle Attitud	de at	Stall, ⁹			1 - 2.0	2 - - - -	3 - 7.0	1.5	- -			
Tire Hop Frequency,	Hz	2.2				•						
Comments:												



Date: 9-21-73 T	ime: <u>(</u> 7	19 24:5	1 Tes	t Vehic	le: <u>M-3</u>	34 61	NHEEL	DRIVE	
Vehicle Weight, Tru	ck: <u> </u>	,536 L	BS.	Trailer	<u> </u>		Tire Gr	oup:	G
Inflation, psig:	5	Ambient	Temp.	°F.:	18	Surface	Temp.	°F.:	84
Relative Humidity %	: 55	W.	ind Spe	ed, mph	:	Win	d Direc	tion:	NE
		•							Inches
Sand Moisture Conte	nt, %	(at cou	rse loca	ation):	200 Fee 400 Fee		3 ,30 ,40	9 : 45 :35	18 .35 .35
			Left 1	Rear			Right :	Rear	
Run Number:		1	2	3	4	1	2	3	4
Tire Track Depth, I Tire Track Width, I		5,50 23,00	5.50 22.00	5.13	<u>5,50</u> 23,50	5.00 23.50	4.75	5,63 23.00	<u>4.25</u> 23.00
Cone Penetrometer Readings in Track	3" 6"	<u>20</u>	60	<u>15</u> 55	²⁰	<u>15</u> 45	10 35	15	<u>25</u>
woodings an ituo	9" 12"	90	95	90	९ऽ	110	135	95	90
	15" 18"	110 290	175 cs	<u>130</u> 05	<u>05</u>	195 05	290	<u>135</u> <u>235</u>	<u>125</u> <u>275</u>
	21"	<u> </u>						-06	<u> </u>
	24"								
Cone Penetrometer Readings in	3" 6"	<u>10</u> 35	<u> 15</u> <u> 45</u>	20 35	<u>20</u> 35	<u> 20</u> 35	15 25	15	35
Virgin Sand	9" 12"	50	<u>45</u> 40	35 35	40	<u>35</u> 35	30 30	30 40	<u>30</u> 25
,	15" 18" ·	55 215	45 0S	40 290	<u>65</u> 00	<u>90</u> 05	70 225	105	105
	21" 24"	<u>05</u>		<u>05</u> -		-	<u> </u>		- 05
Plate Penetrometer	3"	<u>'21</u>	.21	71	24	22	7.5	28	<u>23</u>
Readings in Track, psi	6" 9"	<u>69</u> 95	<u>54</u> 94	<u> 59</u> <u>97</u>	<u>51</u> 96	101	52 104	52 97	57 105
Cone Penetrometer	3"	<u>'21</u>	24	25	21	24	76	71	
Readings in Virgin Sand, psi	6" 9"	- <u>33</u> - <u>55</u>	38	34_	<u> 38</u> 53	34 39	<u>цо</u> 37	<u>31</u> 53	33 35
Test Vehicle Attitu	de at	Stall,	% - Fro	umber: nt Up: nt Down	: 1	2	<u> </u>	1,5	
Tire Hop Frequency,	Hz	3.0				•			
Comments:									

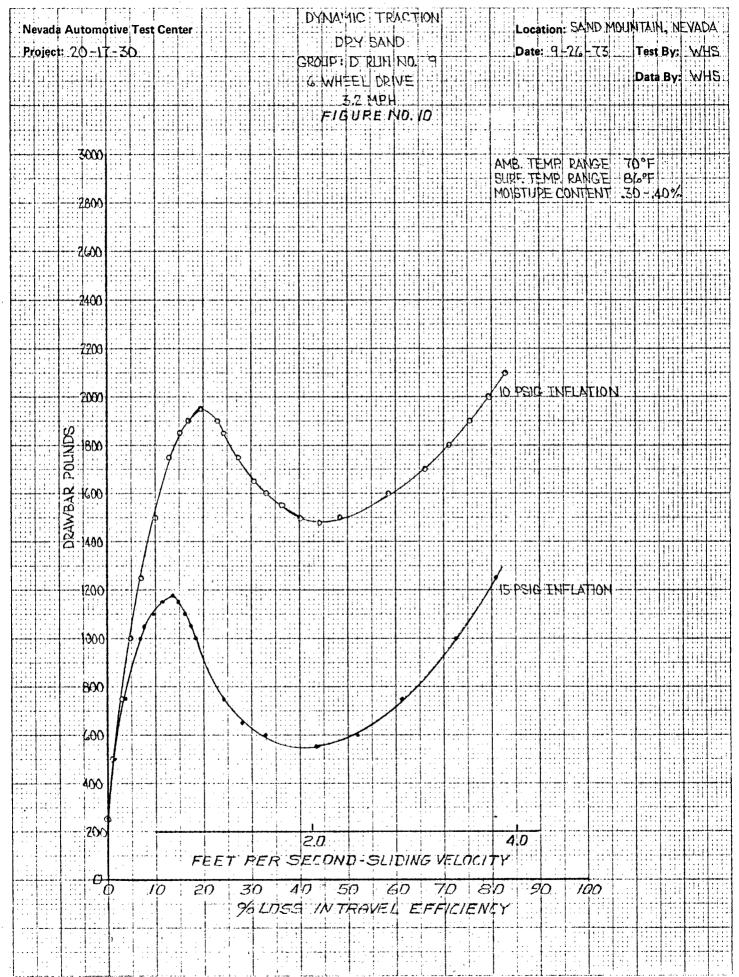
Date: 4-21-73 T	'ime:_	1:10 PM	Tes	t Vehic	le: <u>M</u>	. 'ろ니	6 WHE	EL DEI	√ E
Vehicle Weight, Tru	ck: 1	1,536 LT	35	Trailer	<u> </u>	,	Tire Gr	oup:	(S
Inflation, psig: \(\frac{1}{2}\)	<u>0</u>	Ambient	Temp.	°F.:	78	Surface	Temp.	°F.:	84
Relative Humidity %	: 5	5 W:	ind Spe	ed, mph	: 1	Win	d Direc	tion:	NE
			-	· -				Depth,	
Can d Walatura Octob		<i>(</i>	•		000 7		3	9	18
Sand Moisture Conte	nt, %	(at cour	rse loc	ation):	400 Fee		<u>:30</u>	.45 .35	.35 .35
•			Left	Rear			Right 1	Rear	
Run Number:		1	2	3	4	1	2	3	4
Tire Track Depth, I Tire Track Width, I		3.88	4.00	4.00 20.00	3.25	18.50	<u>400</u> 18.50	4.00	<u>4.50</u> 18.25
Cone Penetrometer Readings in Track	3" 6" 9"	25 75	10 8c	25 <u>65</u>	15 55	35	30	75	<u>25</u> <u>70</u>
	12" 15" 18"	30 235 05	90 15 195	35 95 205	30 150	65 105 195	110	95 130 215	90 130 255
	21" 24"		<u>-05</u>		<u> </u>	<u> </u>		<u> </u>	<u> </u>
Cone Penetrometer Readings in Virgin Sand	3" 6" 9" 12" 15" 18" 21"	20 45 60 65 30 05	30 50 55 65 90 290 05	25 55 60 70 90 295 05	25 45 60 70 95 235 05	30 50 45 60 05	20 50 50 40 30 160 05	20 55 75 90 125 195	15 45 70 80 100 135 250 05
Plate Penetrometer Readings in Track, psi	3" 6" 9"	29 56 103	21 49 79	21 61 31	28 49 92	32 56 98	72	23 <u>79</u> <u>78</u>	30 58 94
Cone Penetrometer Readings in Virgin Sand, psi	3" 6" 9"	<u> 44</u> <u> 68</u>	30 51 72	29 49 70	24 50 69	27 39 39	76 39 44	29 56 92	75 59 89
Test Vehicle Attitu	de at	Stall, 9	- Fro	umber: nt Up: nt Down	: 1.0	1.0	<u>3</u> <u>Z.o</u>	7.0	- - -
Tire Hop Frequency,	Hz	2.6	······				4		
Comments:									

Date: 9-26-73 T	ime:	9:25 AM	Tes	t Vehic	le: <u>M</u> -	-34	6 WHE	ELDRI	VE.
Vehicle Weight, True	ck:	536 L	.BS	Trailer	<u>40</u> :		Tire Gr	oup:	<u>Ca.</u>
Inflation, psig: 10)	Ambient	Temp.	°F.:	55	Surface	Temp.	°F.:	54
Relative Humidity %	:	<u> </u>	ind Spe	ed, mph	:	Win	d Direc	tion:	ENE
									Inches
Sand Moisture Conte	nt, %	(at cou	rse loc	ation):	200 Fee		3 .35 .35	9 .30 .35	. HD - HD
			Left :	Rear			Right		
Run Number:		1	2	3	14	1	2	3	4
Tire Track Depth, In Tire Track Width, In		5.co 22.50	6.25 22.50	<u>6.00</u> 23.00	<u>5.50</u> 23.00	<u>5,25</u> 22,50	5.00 23.00	6.00	6.00 23.00
Cone Penetrometer Readings in Track	3" 6" 9" 12" 15" 18" 21"	15 70 95 120 05	20 55 \\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	25 55 30 35 05	20 35 85 05	15 80 100 145 65	25 95 95 205 05	90 100 160 05	25° 70 90 110 05
Cone Penetrometer Readings in Virgin Sand	3" 6" 9" 12" 15" 18" 21"	15 25 25 25 20 20 290	10 20 20 20 20 20 20 245 65	30 35 35 45 235 65	15 25 30 30 25 290	10 25 30 30 30 165 05	10 15 35 35 25 25 25 05	25 35 40 55 285 06	10 25 40 50 60 200 05
Plate Penetrometer Readings in Track, psi	3" 6" 9"	22 59 98	37 59 96	_ <u>79</u> _71 _91	29 67 81	23 61 103	35 71 109	_ <u>27</u> 	34 73 95
Cone Penetrometer Readings in Virgin Sand, psi	3" 6" 9"	21 30 31	17 28 38	73 78 35	22 33 40	19 33 43	19 34 44	23 33 45	21 34 43
Test Vehicle Attitu	de at	Stall,	% - Fro	umber: nt Up: nt Down	: 0.5	5 1.0	3	1.0	
Tire Hop Frequency,	Hz	الم. 2				•			
Comments:		,							
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Date: 9-26-73 T	ime:_\	0115 AV	Tes	t Vehic	le: <u>M-</u>	34 6	WHEEL	- DRIVE	
Vehicle Weight, Tru	ck:	,536 L	BS '	Trailer	<u>au</u> :		Tire Gr	oup:	7
Inflation, psig: 1	5	Ambient	Temp.	°F.:	61	Surface	Temp.	°F.:	60
Relative Humidity %	: 48	W:	ind Spe	ed, mph	::	Win	d Direc	tion:	E
		,					Sample	Depth,	Inches
Sand Moisture Conte	nt,%	(at cour	rse loc	ation):	200 Fee	et:	3 ,35	9 ,30	18 .45
	-				400 Fee		·35	-35	140
•			Left 1	Rear			Right 1	Rear	
Run Number:		1	2	3	4	1	2	3	4
Tire Track Depth, I Tire Track Width, I		4.25	<u>4.00</u> 24.00	4.25 24.25	5.00 23.00	4.75 24.00	3.50 24.00	4.25	5.00 24.00
Cone Penetrometer	311	20	15	10	20	_15_	70_	_10	_15_
Readings in Track	6"	45	45_	40_	70	55	60	75	50
	9"	90	85	140	90	95	105	90	90
	12"	105	130	160	90	225	225	160	190
	15"	05	05	0.5	లక	05	<u> </u>	05	05
	18"	·-	_				_		
•	21"		_		_	-			
	24"		_						
					4				
Cone Penetrometer	3"	10	<u> 10</u>	01	10	12	10	10	10
Readings in	6 ''	30	25	30	70	30	<u>30</u>	30	20
Virgin Sand	9"	40	30	40	30	32	35	30	25
	12"	45	<u> 30</u>	50	35	<u> 35</u>	40	30	30
1	15"	75	40	<u>85</u>	50	60	40	55	25
	18"	285	285	05	290	290	05	0.5	230
	21"	<u>08</u>	05		05	05		***	05
	24"								
District Descriptions	211								
Plate Penetrometer	3" 6"	76	21		21	29	121	20	29
Readings in Track,	911	59	39_	48	78	6.4	<u> 51</u>	59	57
psi	9	105	101	83	95	110	105	103	707
Cone Penetrometer	311	:0	٠ - حا	١,٥	* 1	<i>(,</i> 4	٠,	1	19
Readings in	6"	<u>19</u> 34	13	32	<u>-21</u> -31	78	<u>15</u> 36	<u>15</u> 21	35
Virgin Sand, psi	9"		78	41	39	38	45	39	49
virgin band, psi	3	<u>-41</u>	_37_		2-1	23	43	27	
				umber:	_ i	2	3	4	_
Test Vehicle Attitud	de at	Stall, 8							_
			From	nt Down	: 176	7.0	1.0	0,5	<u> </u>
Tire Hop Frequency,	Hz	2.7						•	
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Comments:							·		

Date: 9-26-73 T	ime: <u>\</u>):35 AM	Tes	t Vehic	le: <u>M-</u>	34 6	. WHEE	LDRIV	ξ
Vehicle Weight, True	ck: <u>11</u>	536 1	-BS	Trailer	<u>au</u> :	······································	Tire Gr	oup:	J
Inflation, psig:	<u> </u>	Ambient	Temp.	°F.:	lo l	Surface	Temp.	°F.:	60
Relative Humidity %	: ૫8	W.	ind Spe	ed, mph	: 10	Wind	d Direc	tion:	E
		·					Sample 3	Depth,	Inches
Sand Moisture Conte	nt, % (at cou	rse loc	ation):	200 Fee 400 Fee		, 35	,35	· 1 40
,			Left :	Rear			Right 1	Rear	
Run Number:		<u> </u>	2	3	4	1	2	3	4
Tire Track Depth, In Tire Track Width, In		5.00 21.50	4.75 22.50	4.50 22.00	5.50 22.00	5.50 22.60	5.75 24.00	4.50	<u>6.00</u> 23.00
Cone Penetrometer Readings in Track	311 611	20	<u> 20</u>	10	10	15	<u>.25</u>	<u>20</u> \$5	70
Readings in Hack	9"	<u>80</u>	170	90	80 80	35	90	102	<u>70</u> 95
	12"	175	195	175	105	190	180	155	145
	15"	05	೦ಽ	0.8	05	05	<u> </u>	05	05
	18" 21"							_	
•	24"						·_		
Cone Penetrometer	3"	10	10	10	10	10	15	15	10
Readings in Virgin Sand	6" 9"	25	25	25	30	20	25	35	70
ATTATIL Salid	12"	35 40	30	35 35	<u>40</u> 45	<u>30</u> 40	<u>30</u> 25	45	<u>40</u>
	15"	80	80	<u> </u>	70	70	120	70	85
	18"	290	265	170	275	285	290	80	290
	21"	05	05	<u>68</u>	<u> </u>	05	05	265	05
	24"							<u> </u>	
Plate Penetrometer	3"	23	22_	2.3	23	27	25	25_	29
Readings in Track,	6"	67	57	45	46	58	65	49	55
psi	9"	99	103	97	95	99	106	97	100
Cone Penetrometer	3"	_19		21	_19_		2.1	19	15
Readings in	6"	27	23	24.	32	26	35	58	2.9
Virgin Sand, psi	9"	38	31	38	34	35	<u> 4'7</u>	<u>32</u>	39
				umber:	1	2	3	4	
Test Vehicle Attitud	de at S	stall, '		nt Up: nt Down	<u> </u>			1.0	<u> </u>
Tire Hop Frequency,	Hz	2.3			·.			-	
Comments:									
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Date: 9-76-73 T	ime: <u> </u>	1:40 AN	Test	t Vehic	le: <u>M-</u>	34	6 WHE	EL DRIV)E
Vehicle Weight, True	ck: <u> </u>	536 L	85	Trailer	NA_	·	Tire Gr	oup:	D
Inflation, psig:	5	Ambient	Temp.	PF.:	0	Surface	Temp.	°F.:	86
Relative Humidity %	30	Wi	ind Spe	ed, mph	:\	Win	d Direc	tion:	E
· ·		•							Inches
Sand Moisture Conte	nt, %	(at cour	rse loca	ation):	200 Fee 400 Fee		3 .30 .35	9 .35 ,40	18 ,35 .40
			Left I	Rear			Right 1	Rear	
Run Number:		1	2	3	11	1	2	3	4
Tire Track Depth, In Tire Track Width, In		<u>5.co</u> 22.50	5.15 22.00	5.50 21.50	<u>6.00</u>	5.00 23.50	5.25 23.50	5.co 23.co	5,50 24.00
Cone Penetrometer Readings in Track	.3" 6" 9" 12" 15" 18" 21"	20 65 85 115 05	20 60 90 105 05	15 70 85 130 05	10 80 90 110 cs	20 55 130 225 05	15 55 110 205 05	10 35 140 135 06	70 95 155 05
Cone Penetrometer Readings in Virgin Sand	3" 6" 9" 12" 15" 21" 24"	10 30 40 45 45 245 05	10 30 40 40 45 215 05	10 20 25 25 25 55 210 65	15 30 40 40 100 285 05	15 20 20 25 25 235 05	15 30 30 25 70 05	10 30 30 30 30 110 285 05	10 20 30 30 55 210 0 \$
Plate Penetrometer Readings in Track, psi	3" 6" 9"	28 65	25 64 93	76 59 101	28 51 98	72 70 98	29 -71 102	21 66	25 66 101
Cone Penetrometer Readings in Virgin Sand, psi	3" 6" 9"	17 29 36	21 39 39	18 26 29	39 40	21 29 32	22 32 42	24 35 39	22 32 44
Test Vehicle Attitud	de at	Stall, 9	- From	umber: nt Up: nt Down	: 1.0	2 - 1.S	3	<u> </u>	
Tire Hop Frequency,	Hz	۵،6				•			
Comments:									

Date: 9-26.73 1	ime: V	1100 PM	Tes	t venic.	Te: W/-	34 (· WHEE	L DRIVE	<u> </u>					
Vehicle Weight, True	ck: <u> </u>	,536 <u>L</u>	BS.	Trailer	: NA		Tire Gr	oup:	D					
Inflation, psig:	5 <i>I</i>	Ambient	Temp.	°F.:	70	Surface	Temp.	°F.:	१ ८					
Relative Humidity %	: 30	ĖW	ind Spe	ed, mph	:/	Win	d Direc	tion:	E					
							Sample 3	Depth,	Inches					
Sand Moisture Conte	nt, % ((at cour	rse loca	ation):	200 Fee 400 Fee		,30 ,35	.35 .40	.35 .40					
			Left 1	Rear			Right :	Rear						
Run Number:		1	2	3	4	1	2	3	4					
Tire Track Depth, In Tire Track Width, In		5.00 20.50	5.50	5.50 21.50	5.25	5.50 20.50	5.50 21.50	6.0C 20.50	5.15 21.00					
Cone Penetrometer Readings in Track	6" 6"	20 9c	<u>35</u> <u>15</u>	\5 \ <u>\$0</u>	35	20 60	30 70	<u>5</u> <u>25</u>	30					
9"														
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18"														
Cone Peretremeter	3"													
Cone Penetrometer Readings in	6"	<u>5</u> 20	25	<u>5</u> 20	35	20	5 20	<u>10</u> 25	<u>5</u> 15					
Virgin Sand	9" 12"	25 25	<u>25</u> 25	<u>30</u> 30	<u>40</u> 45	30 40	<u>30</u> 30	<u> 25</u> 30	<u>30</u>					
, .	15" 18"	40 280	<u>60</u>	290	45 225	75 290	45 280	45 285	50 210					
	21" 24"	05		05	०ऽ	05	0.5	05	05					
Plate Penetrometer Readings in Track,	3'' 6''	<u>30</u> 65	<u>34</u>	<u>33</u> _78	265 65	<u>33</u> 83	<u>38</u> <u>13</u>	35 65	<u>39</u> <u>67</u>					
psi	9"	100	४७	100	90	94	96	89	93					
Cone Penetrometer Readings in	3" 6"	<u>26</u> 28	<u>19</u> 25	<u>19</u> 27	<u>24</u> 41	7.6 7.6	160 260	<u>17</u> 25	<u>16</u> 25					
Virgin Sand, psi	9"	42	<u> 25</u>	37	<u>58</u>	32	29	33	30					
			Run N	umber:	1_	2	3	4						
Test Vehicle Attitu	de at	Stall, 9		nt Up: nt Down	: 1.0	1.5	1.0	1.0						
Tire Hop Frequency,	Hz	2.3												
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Figures 11 through 14

Dynamic Traction - Dry Sand, Rerun Group A

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Run Number: 1 2 3 4 1 Tire Track Depth, Ins.: 3.75 2.25 2.5 - 3.5 Tire Track Width, Ins.: 13.75 12.12 12.5 - 73.5 Cone Penetrometer 3" 39 51 54 - 40 Readings in Track 6" 290 300 300 - 280 9" 05 05 05 - 05 12"	Sample Dep	th, Inche
Run Number: 1	3 9	18
Run Number: 1 2 3 4 1 Tire Track Depth, Ins.: 3,75 2.25 2.5 - 3.5 Tire Track Width, Ins.: 13.75 12.125 12.5 - 73.5 Cone Penetrometer 3" 39 51 54 - 40 Readings in Track 6" 290 300 300 - 280 9" 05 05 05 - 05 12"	Right Rear	
Tire Track Width, Ins.: 12.75 12.12 12.5 — 13.5 Cone Penetrometer 3" 39 51 54 — 40 Readings in Track 6" 290 300 300 - 2.80 9" 05 05 05 - 05 12"	2 3	
Tire Track Width, Ins.: 12.75 12.12 12.5 — 13.5 Cone Penetrometer 3" 39 51 54 — 40 Readings in Track 6" 290 300 300 - 2.80 9" 05 05 05 - 05 12"	3.0 2.	75 -
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12"	280 290	
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Cone Penetrometer 3" 30 30 35 - 37 Readings in 6" 250 240 270 - 240 Virgin Sand 9" 05 05 05 - 05 12"	***	
Readings in 6" 250 240 270 - 240 Virgin Sand 9" 05 05 05 - 05 12"		
Readings in 6" 250 240 270 - 240 Virgin Sand 9" 05 05 05 - 05 12"	70 60	
Virgin Sand 9" 05 05 05 05 05 05 05 05 05 05 05 05 05	28 40	
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21" 24" Plate Penetrometer 3" 48 50 55 - 45 Readings in Track, 6" 105 120 105 - 100 psi 9" 05 35 05 PLATE General Penetrometer 3" 40 42 44 - 35 Readings in 6" 100 100 110 - 100	معر بسر بسروسه : <u>سروسه در بای</u> باین در بایده	
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Run Number:		1	2	3	4	1	2	3	4

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Vehicle Weight, Tru	ck: 11	,536 (35	Trailer:		•	Tire Gr	oup:	4				
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Plate Penetrometer Readings in Track, psi	3" 6" 9"	48 120 05	45 //0 0 S	40 90 05		50 110 05	50 110 05	45 90 05					
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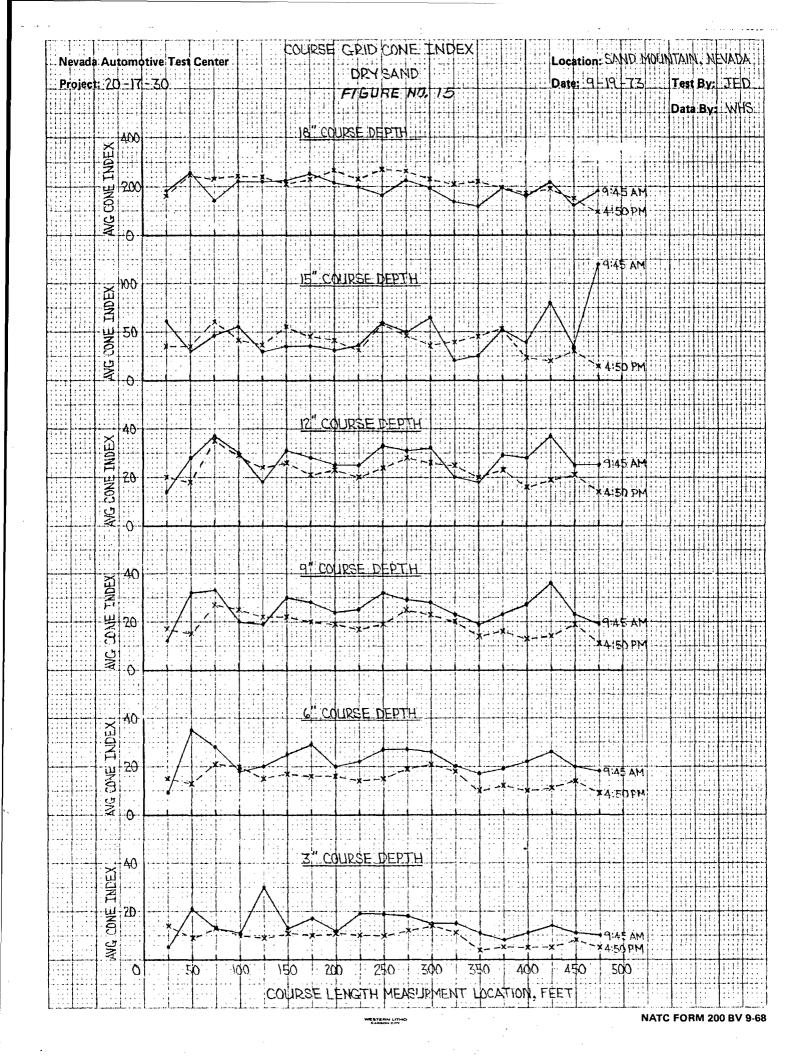
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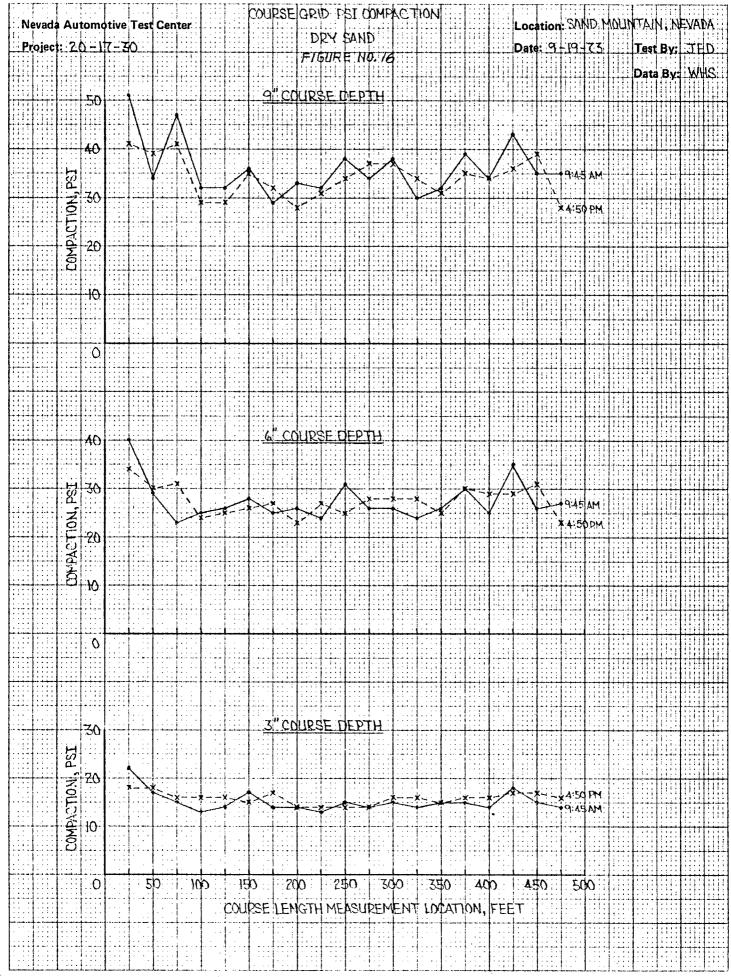
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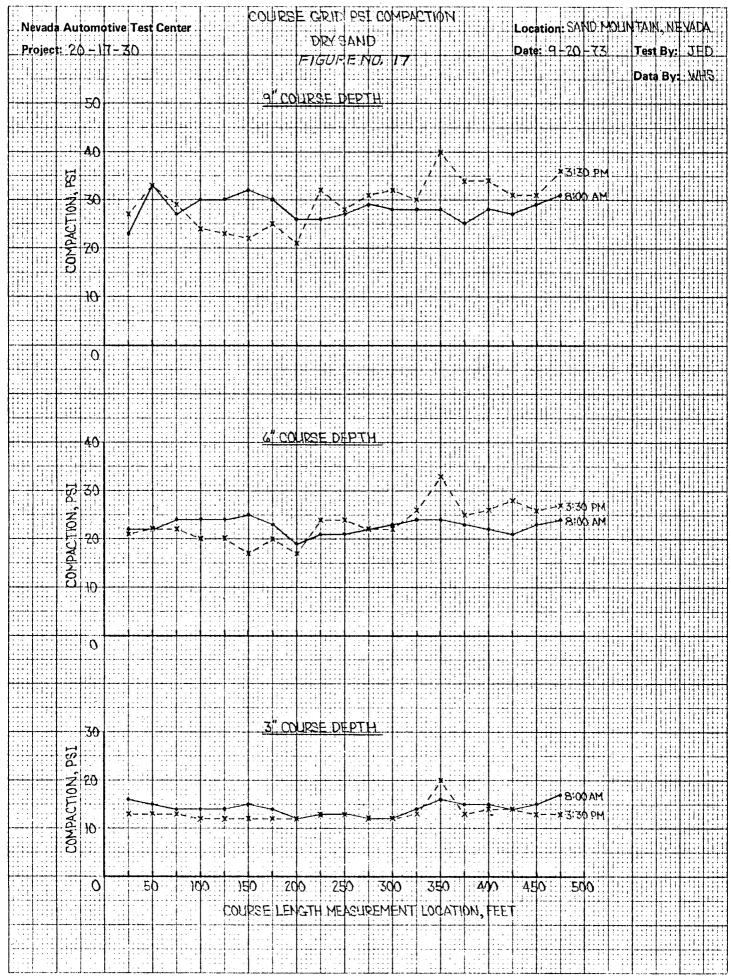
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Sample Depth, Inch 3 9 18 Sand Moisture Content, % (at course location): 200 Feet: 400 Feet:	Inflation, psig:	15_ A	mbient	Temp. '	PF.:	60_	Surface	Temp.	°F.:7	12
Sand Moisture Content, % (at course location): 200 Feet: ### 400 Feet: Left Rear	Relative Humidity %	:40	<u> </u>	ind Spec	ed, mph	<u>8</u>	Wind	d Direc	tion:	W
Sand Moisture Content, % (at course location): 200 Feet:								-		
Run Number: 1 2 3 4 1 2 3 4 Tire Track Depth, Ins.: 2.25 2 2.5 - 2.5 2.0 2.25 - Tire Track Width, Ins.: 12.0 12.0 12.0 - 12.0 12.0 12.0 12.0 12.0 12.0 12.0 12.0	Sand Moisture Conte	nt, % (at cour	rse loca	ation):				9	18
Tire Track Depth, Ins.: 2.25	•					· · · · · · · · · · · · · · · · · · ·				
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18"	Readings in	6" 9"	2.70	27.2	270 OS		260	265	270.	
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Gene Penetrometer 3" 39 39 40 - 41 44 - Readings in 6" \$10 35 \$15 - \$0 \$7 90 - Virgin Sand, psi 9" 05 05 05 - 05 05 05 - Run Number: 1 2 3 4 Test Vehicle Attitude at Stall, % - Front Up: - - - - Front Down: D 0 0 -	Readings in Track, psi	6"	95	100	100		20	110	100	
Test Vehicle Attitude at Stall, % - Front Up:	Gene Penetrometer Readings in	6"			£3° .		६०	87	90	general contractions of the contraction of the cont
Tire Hop Frequency, Hz	Test Vehicle Attitu	de at S	Stall, 9	- Fro	nt Up:	· <u>- 1</u>	2	3		
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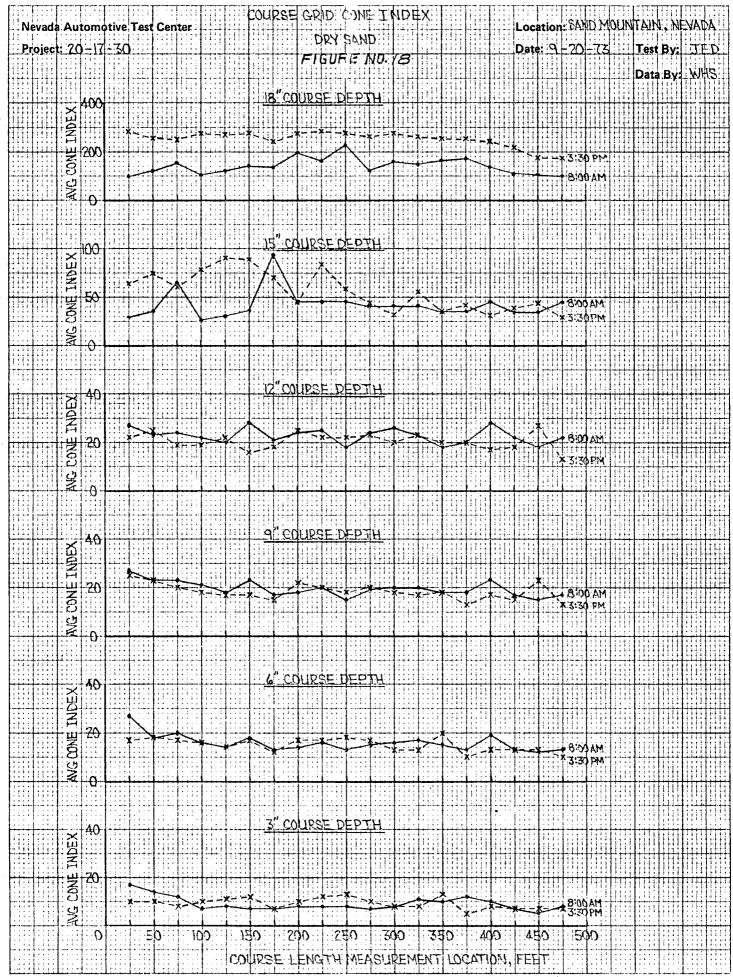
Figures 15 through 22

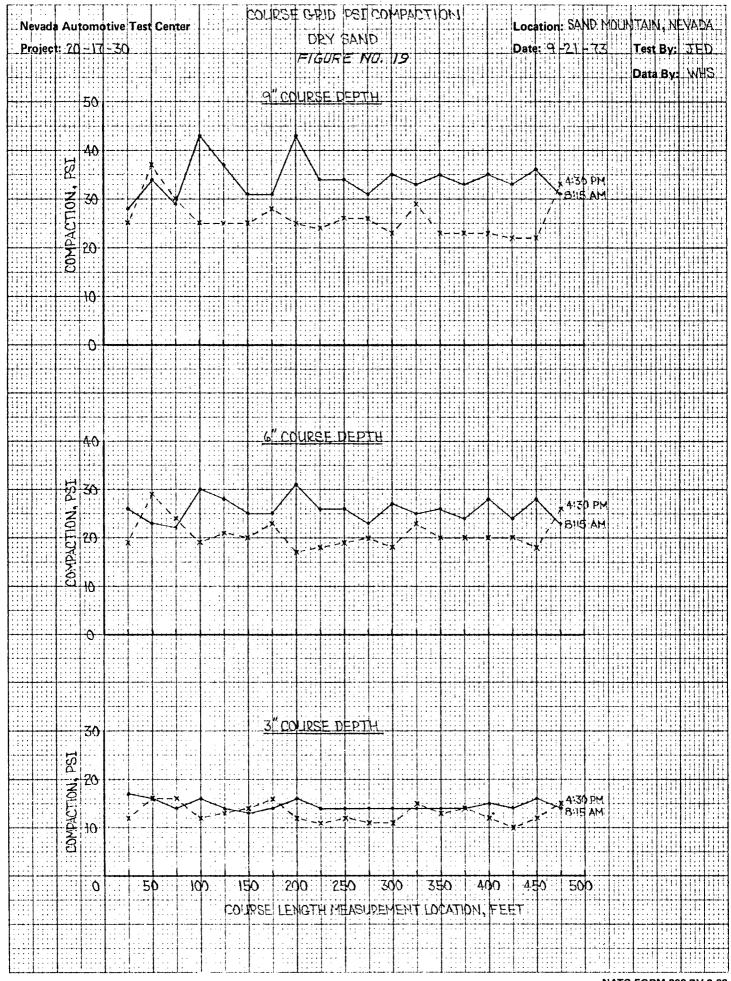
Dry Sand Course Grid Profiles

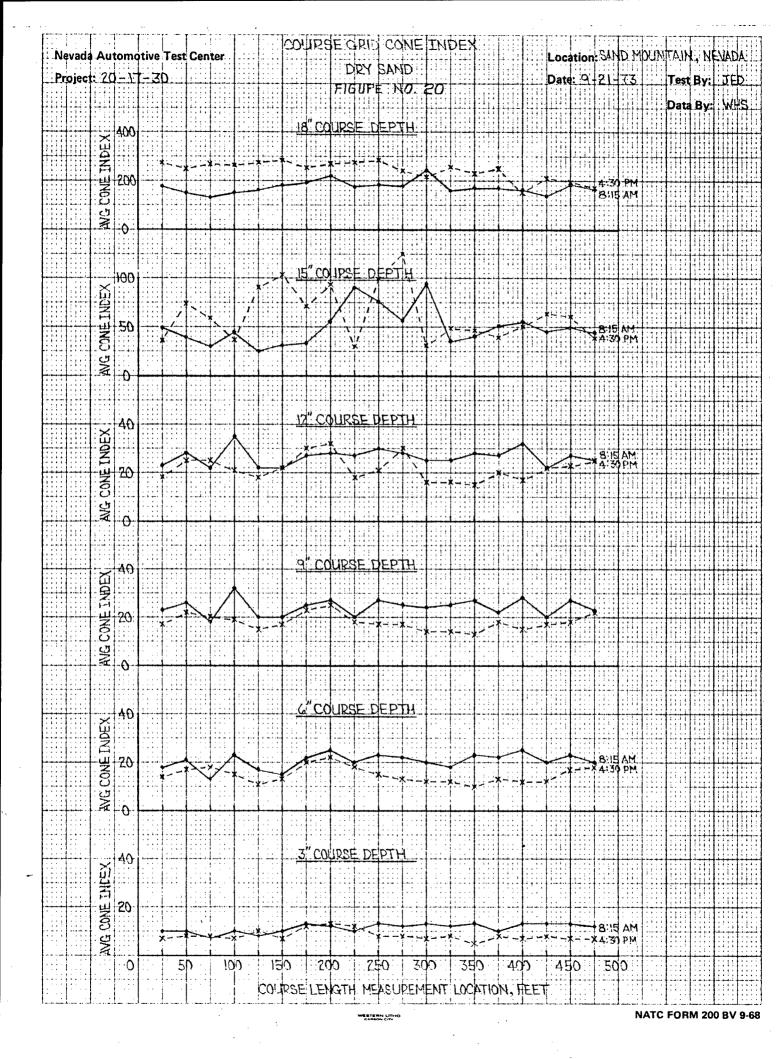


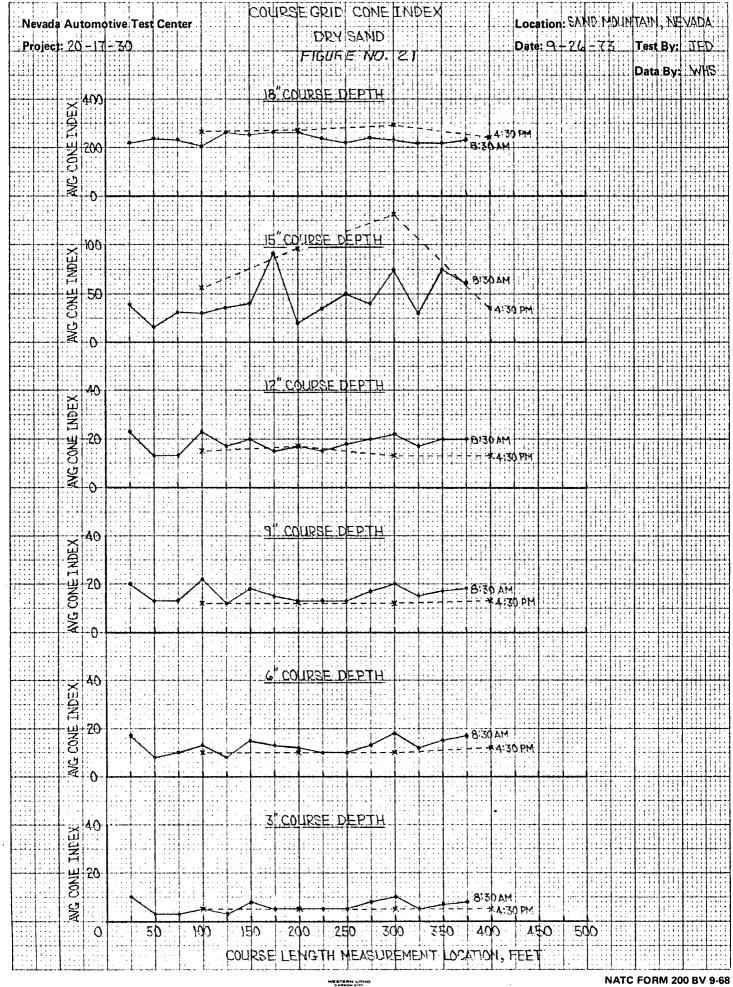


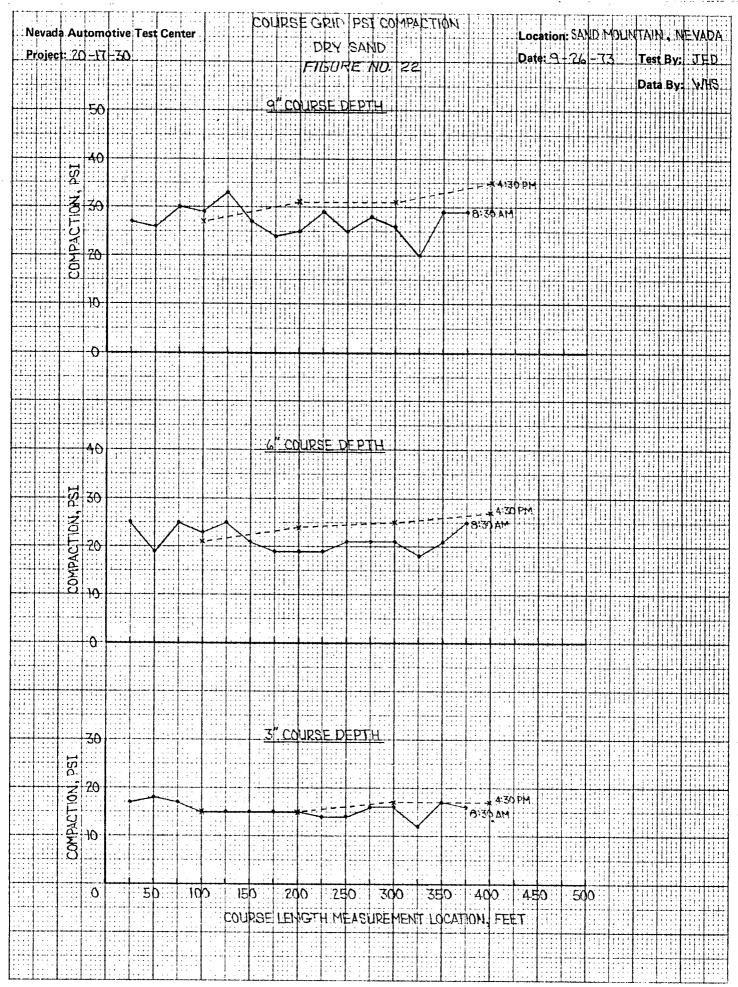












Figures No. 23 & 24

Rolling Resistance - Dry Sand

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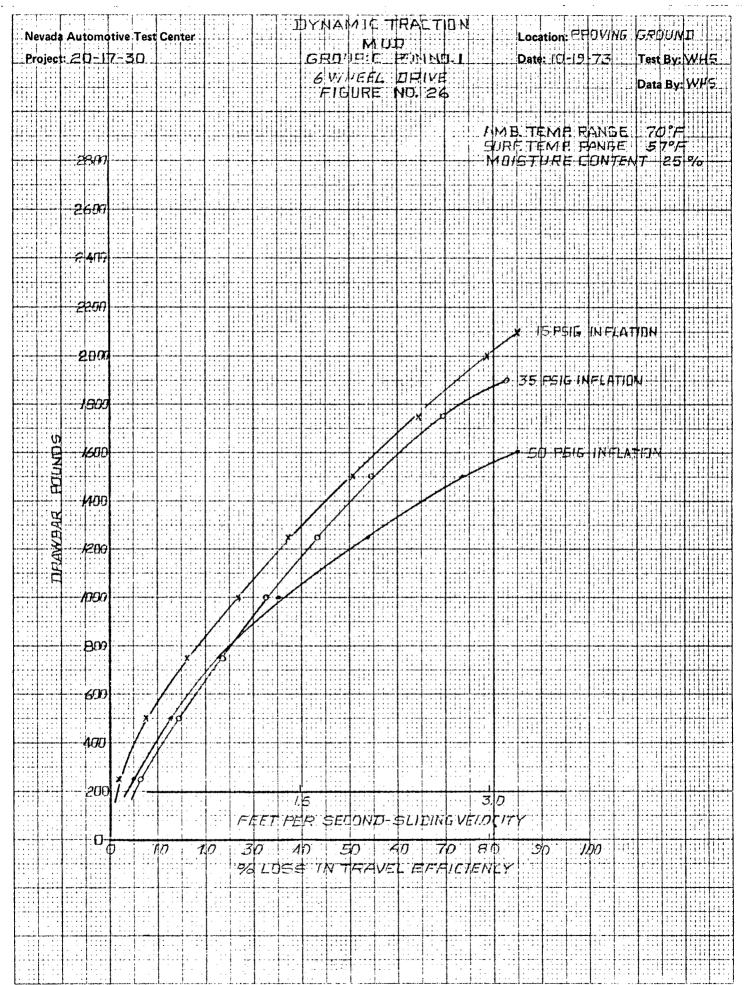
Figure No. 25

Dynamic Traction Summary - Prepared Mud

NOTE 01 13 - 12 - 13 - 12 - 13 - 12 - 13 - 12 - 13 - 12 - 13 - 12 - 13 - 12 - 13 - 12 - 13 - 12 - 13 - 12 - 13 - 12 - 13 - 13	Nevada Automotive Test Center	Test Center			DYNAN	AIC TRE	ANIIC TRACTION RATINGS	RATING	5	ר	Location: PROVING GROUND	VING G	ROUNT	
### DIRECTIONAL FIGURE NO.26 ### ANOUNTED INCRECTORY INTERPATED. ### ANOUNTED INCRECTORY INTERPATED. ### ANOUNTED INCRECTORY INTERPATED. ### ANOUNTED INCRECTORY INTERPATED. ### ANOUNTED INCRECTORY INTERPATED. ### ANOUNTED INCRECTORY INTERPATED. ### ANOUNTED INCRECTORY INTERPATED. ### ANOUNTED INCRECTORY INTERPATED. ### ANOUNTED INCRECTORY INTERPATED. ### ANOUNTED INCRECTORY INTERPATED. ### ANOUNTED INCRECTORY INTERPATED. ### ANOUNTED INCRECTORY INTERPATED. ### ANOUNTED INCRECTORY INTERPATED. ### ANOUNTED INCRECTORY INTERPATED. ### ANOUNTED INCRECTORY INTERPATED. ### ANOUNTED INCRECTORY INTERPATED. ### ANOTHER TOP INCRECTO	roject: 20-17.	30				6 WHEE	T DRIVE			Õ	ate: 10-19/2	0-73 Te	st By: W	$\overline{\mathfrak{O}}$
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516 • 1575 2050 2405 1900 2475 1530 1600 2000 2500 516 X 1875 2520 2200 2200 1700 2075 2525 2525 5516 0 2025 2550 1900 2150 2700 2070 2675 2525 507 1900 2150 2700 2700 2675 4475 2575 4475 507 25% 25% 25% 25% 25% 25% 25%	TING B 15 P	2/5		101	[6]	96	706	/33					502	
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25% 25% 25% 25% 25% 26% 24% 25%	Parte NR		100	78°F	50°F	1.69	46.5	4400	50°F				7,4	
	ISTURE CONT	- L- Ki	25%	25%	25%	25%	25%	26%	: 1 : : :				24%	

Figures 26 through 34

Dynamic Traction - Prepared Mud



TOTO	DAMA	
TEST	DATA	

Date: 10-19-73 T	ime:/	1:15 A11	Tes	t Vehic	Le: <u>//</u>	34 6	×6	•	
Vehicle Weight, Tru	ck:	53%	. ES	Trailer	<u> </u>		Tire Gr	oup:	
Inflation, psig: 5	<u>O</u> A	mbient	Temp.	°F.:	66	Surface	Temp.	°F.:	6
Relative Humidity %	: 22	W:	ind Spe	ed, mph	0-6	Win	d Direc	tion:_	E
	Mud M	loisture	e Conter	nt, %: Z	5.3	:	Sample 3	Depth,	Inches
			Left	Rear			Right	Rear	
Run Number:	, •	1	2	3	4	1	2	3	4
Tire Track Depth, I Tire Track Width, I		8 <u>/4</u>	8/4	<u>838</u> 73/4		7/2 8	8 38 8	<u>8</u> 34 <u>7/2</u>	
Cone Penetrometer Readings in Track	9" 12" 15" 18" 21"								Comment of the commen
Cone Penetrometer Readings in Mud, psi	3" 6" 9" 12" 15" 18" 21"	2 /0		5 10		7.2		73	
Plate Penetrometer Readings in Track, psi	3" 6" 9"								
Plate Penetrometer Readings in Mud, psi	3" 6" 9"	<u>0</u> -2) 	<u></u>			<u>0</u>	<u> </u>	<u>0</u> 	Nagar Badishan distribution of Sangar Sang Sangar Sang Sangar Sangar San
Comments:			·			•••••			

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Date: 10 6 73 T	ime: /	1:25 A	11 Tes	t Vehic	le: <u> </u>	34 (э×6		
Vehicle Weight, Tru	ck:	1536	.··	Trailer	: 1//	i	Tire Gr	oup:	C
Inflation, psig:	35 A	Ambient	Temp.	°F.:	75	Surface	Temp.	°F.:	58
Relative Humidity %	2.7	2W	ind Spe	ed, mph	:	Win	d Direc	tion:	E
		,					Sample	Depth,	Inche
	Mud M	loistur	e Conte	nt, %: 2	25,3	;	3	9	<u>18</u>
			7 . Ca.	D. a. arina		• •	ni da	D	
Run Number:		<u> </u>	Left 2	3 3	4	1	Right 1	3 3	4
Tire Track Depth, I Tire Track Width, I		7 ⁵ /8	9 7/4			7 ³ /4 8 ¹ /2	_8VB 63/4		-
Cone Penetrometer Readings in Track	. 3" . 6"								
Neddingo in Truck	9" 12"			-					
	15" 18"								
	21" 24"	-			***************************************	•			
Cone Penetrometer Readings in Mud, psi	3" 6" 9"	1)	<u> </u>				<u>5</u> <u>15</u>		
	12" 15" 18"					* ************************************			
:	21" 24"								
Plate Penetrometer Readings in Track, psi	3" 6" 9"								-
Plate Penetrometer Readings in Mud, psi	3" 6" 9"	<u>3</u>)			<u></u>	2		
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Vehicle Weight, True Inflation, psig: / 3									
Relative Humidity %						•			
								Depth,	
	Mud 1	Moistur	e Conter	nt, %: 2	?5,3	:	3	9	18
			Left 1	Rear		•	Right	Rear	
Run Number:	. •	1	2	3	4	1	2	3	4
Tire Track Depth, In Tire Track Width, In		7 ³ /4 8'2	9			8/2	7/4		
Cone Penetrometer Readings in Track	3" 6" 9" 12"								
	15" 18" 21" 24"								Comments of the comments of th
Cone Penetrometer Readings in Mud, psi	3" 6" 9"	5 10 -	10		-	2 5 -	<u> </u>		
,	15" 18" · 21" 24"								
Plate Penetrometer Readings in Track, psi	3" 6" 9"								
Plate Penetrometer Readings in Mud, psi	3" 6" 9"		<u> </u>			<u>0</u>	<u></u>		
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			L DATA			•	• •		
Date: 10-19-73 T	ime:	2:10 PI	1 Tes	t Vehic	le: <u>/1</u>	74 C	6×6		
Vehicle Weight, Tru	ck: 11	536 1	.25_	Trailer	:		Tire Gr	oup:	B
Inflation, psig:	50 1	Ambient	Temp.	°F.:	78	Surface	Temp.	°F.:@	68
Relative Humidity %	:26	<u> </u>	ind Spe	ed, mph	: 0-8	Win	d Direc	tion:_	W
								Depth,	
	Mud 1	Moisture	e Conter	nt, %:2	4.7	:	3	9	18
	•		Left :	Rear			Right	Rear	
Run Number:		1	2	3	4	1	2	3	4
Tire Track Depth, I Tire Track Width, I		8/4 6/2	7/12			7/2	7/2		
Cone Penetrometer Readings in Track	3" 6"								- comp - company of the company of
	9" 12" 15" 18" 21"							The state of the s	The second secon
Cone Penetrometer	3"				-				• • •
Readings in Mud, psi	6" 9" 12" 15"		5 10 			5	55		
•	18" · 21" 24"								- 10
Plate Penetrometer Readings in Track, psi	3" 6" 9"								
Plate Penetrometer Readings in Mud, psi	3" 6" 9"	<u>()</u>	<u> </u>			0	<u>?</u>	-	
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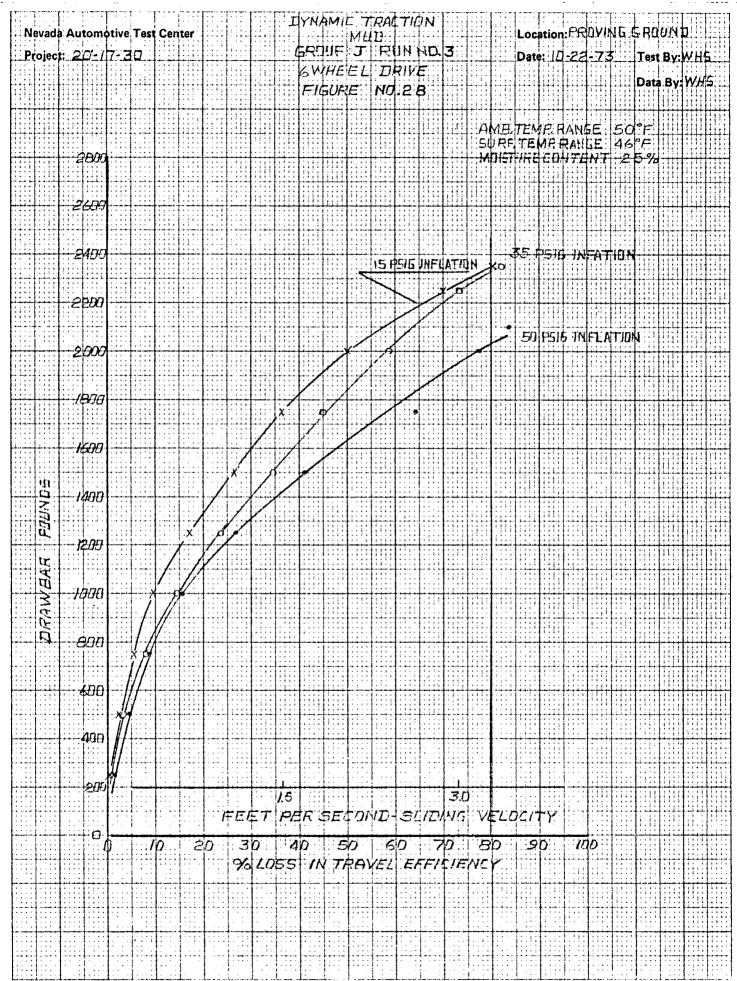
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Date: 10-19-73 -T	ime:	3:00 F/-	Tes	t Vehic	le: <u>///</u> 3	7.1 6%	6		
Vehicle Weight, Tru	ck:	11536	L85	Trailer	· //	7.3	Tire Gr	oup:	\mathcal{B}
Inflation, psig: 3	35	Ambient	Temp.	°F.:	' 3	Surface	Temp.	°F.:	68
Relative Humidity %	: 12	<u>ප</u> W	ind Spe	ed, mph	0.5	Win	d Direc	tion:_	w
							Sample	Depth,	, Inche
	Mud	Moistur	e Conte	nt. %: 2	47		3_	9 -	18
				,		;		-	
•	•		Left	Rear			Right	Rear	
Run Number:	. •	1	2	3	4	1	2	3	4
Tire Track Depth, I	·	-1/	0			· 23%	05		
Tire Track Width, I		7/2	8/4			· <u>634</u>	<u>18 5%</u> 1854		
The Hack Withing I		0/2	_0/4			-()			
Cone Penetrometer	. 311						•	· 	
Readings in Track	611								·
	9"				-				****
•	12"							19	
•	15"	~~		_			***		-
• •	18"		~		-				
	21"								***
•	24"								-
Cone Penetrometer	3"	-س	<u>,-</u>						
Readings in	6"	<u> </u>	<u> </u>			70	<u>-5</u>		
Mud, psi	911								
, po_	12"						-		
	15"				_	`			
•	18"			-					
•	21"								
	24"								
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Plate Penetrometer	3"		_					_	
Readings in Track,									
psi	9"			_				*****	
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Plate Penetrometer	3"	0	17		****		71		
Readings in	6"	0	\bigcirc			<u></u>			
Mud, psi	9"			-	-	* -			
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Comments:									

TEST	DATA	

Date: 10 /5 /5 T						,		· · · · · · · · · · · · · · · · · · ·	T-4
Vehicle Weight, Tru	ck: 113	536 L	.65	Trailer	·:	/ fire	Tire Gr	oup:	В
Inflation, psig:/	5 1	Ambient	Temp.	°F.:	77	Surface	Temp.	°F.:	68
Relative Humidity %	:	W	ind Spe	ed, mph	·	<u>∵</u> Win	d Direc	tion:_	W
							Sample	Depth,	
	Mud N	loistur	e Conte	nt, %: 8	24.7	:	3	9	18
			• 6.		•	;	n.	n	
Run Number:	•	<u> </u>	Left 2	Rear 3	4	1	Right 2	Rear 3	4.
Time Toronto Denth : T		ok:				. 632			
Tire Track Depth, I Tire Track Width, I		88	734			8 ³ /3 6 ³ /4	<u> </u>		
Cone Penetrometer	. 311	•				-			
Readings in Track							-		-
	9"								
	12"							, .,	
	15" 18"								
	21"					•			
•	24"			-	•	•	~		
Cone Penetrometer	3"	<u> = </u>	4	•••	-		7.		<u></u>
Readings in	611	10	10	_	~	10		_	
Mud, psi	9"			-	-				-
,	12"								
	15"							~	-
	18"								
•	21"			-					
	24"			·					
Plate Penetrometer	3"			••		·	·· ,	,	
Readings in Track,	6"								
psi	9"								-
late Penetrometer	3"	0	O			0	0		-
Readings in	6"	0	0		·	$\overline{\partial}$	\odot		
Mud, psi	9"					*	****		
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Comments:									•



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TEST	DATA

Inflation, psig: 5 Relative Humidity % Rum Number: Rire Track Depth, Information Track Width, Information Penetrometer	. 41 Mud N	W		ed, mph	: <u> </u>	*	d Direc Sample	Depth,	
un Number: ire Track Depth, In ire Track Width, In	Mud N	loistur	e Conter Left	nt, %: ?	25.1	Win	Sample 3	Depth,	
ire Track Depth, In ire Track Width, In one Penetrometer	ns.:	1	Left :	Rear		: :	3	9 -	
ire Track Depth, In ire Track Width, In one Penetrometer	ns.:	1	Left :	Rear		;		***	
ire Track Depth, In ire Track Width, In one Penetrometer	ns.:	1	Left :	Rear		;	Right		
ire Track Depth, In ire Track Width, In one Penetrometer					1.		Right '		
ire Track Depth, In ire Track Width, In one Penetrometer				3				Rear	
ire Track Width, In		73			4		2	3	4
		11	81/9			6½ 10¾	83 ₄ 8½		***
	3"					<u> </u>	•		
Readings in Track	6"		_						
	9"								
	12"								
•	15"					•••		~~	
	18"					·			
	21" 24"								
one Penetrometer	3"	<u> </u>							
Readings in	6"	10	<u></u>			<u>Z</u>			
Mud, psi	911		-3	****		10	10		
	12"								
	15"								
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	24"	1.000		100					
late Penetrometer	3"	No. of Contrast, Name of Stree			,	5 <u>44</u> 5			-
Readings in Track,	6"				-		***	~	
psi	9"								
late Penetrometer	3"	. ``	ن			O	()	4.*	.440
Readings in	6"						>	,	Nan.
Mud, psi	9"				**				
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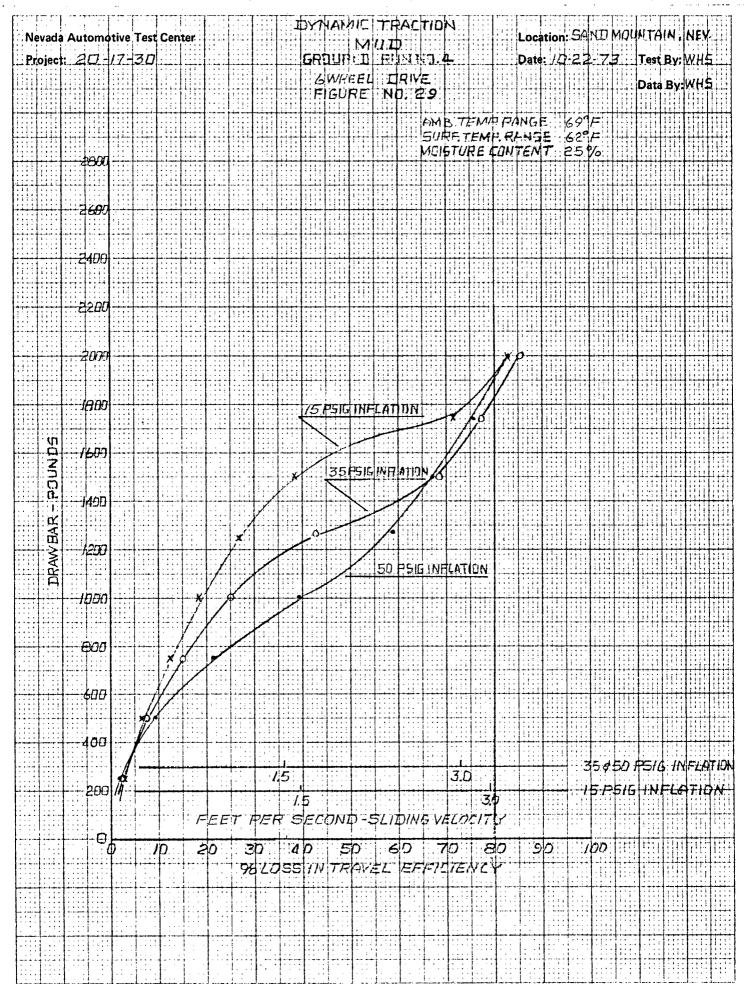
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Date: 10 22 73	Time:	10:15	Tes	t Vehic	le: <u>/</u>	134 (6×6		
Vehicle Weight, Tru	ick:	11,536	L3S	Trailer	:	7	Tire Gr	oup:	J
Inflation, psig: 3	55	Ambient	Temp.	°F.:	50	Surface	Temp.	°F.:_4	6
Relative Humidity	5: 4.0) W	ind Spe	ed, mph		Win	d Direc	tion:	
					•			Depth,	
	Mud	Moistur	e Conte	nt, %:	25.1	:	3	9	18
			7 - C-	D		•	nt	D	
Run Number:		1	Left 2	Rear 3	4	1	Right 2	.3	4
Tire Track Depth, 1	ins.:	81	734	7		·	8 98	73/4	
Tire Track Width, 1	Ins.:	_&	3:	8/4		734	· ·	8/2	
Cone Penetrometer Readings in Track	3" 6"								
Reddings in Hack	9"								
•	12" 15"								
•	18" 21"								
	24"							•	
Cone Penetrometer Readings in	3" 6"	4					_5_		****
Mud, psi	9"	<u></u>		<u>15</u>		15	<u>-42</u>	<u> </u>	
	12" 15"			. ***	-	1		**************************************	
	18" · 21"	*	,						
	24"								
Plate Penetrometer Readings in Track,	3" 6"			<u> </u>					
psi	9"					"			
Plate Penetrometer Readings in	3" 6"					<u>~</u>		<u> </u>	
Mud, psi	9"		•						•
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Vehicle Weight, Tru	ck: <u>/</u>	1,536 L	BS	Trailer	<u></u>		Tire Gr	oup:	J
Inflation, psig:/	5	Ambient	Temp.	°F.:	51	Surface	Temp.	°F.:	47
Relative Humidity %	: 40) W	ind Spe	ed, mph	2-7	Win	d Direc	tion:_	N
						•		Depth,	
	Mud	Moistur	e Conter	nt, %: 2	5.1	:	3_	9	18
•				·		;			
			Left 1	Poan			Right	Roam	
Run Number:		1	2	3	4		2	3	4
· · ·	•								
Tire Track Depth, I	ns.:	6=	7 3/4	<u> </u>		. 7	BZ		_
Tire Track Width, I		84	8			73/4	<u> </u>		
•	,				•				
Cone Penetrometer	3"								
Readings in Track	6"						****	·	
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	18"					*****			
	21"								
•	24"	~					****		
	٥.,							•	
Cone Penetrometer	3" 6"	_5_	5			<u> </u>	<u> </u>		•
Readings in Mud, psi	911	<u> </u>	5			_5_	5	-	
naa, psi	12"							*****	
	15"	****				·			
	18"								
	21"			~					
	24"	•	•	***				•••	
late Penetrometer	3!"								
Readings in Track,	6 "								
psi	9"		,				***************************************		
late Penetrometer	3"	.*5	•			2°			
Readings in	6"		- 3						****
Mud, psi	9"					· 1			
· 7 // · ·	- .,		-						

Comments:	:



TEST DATA

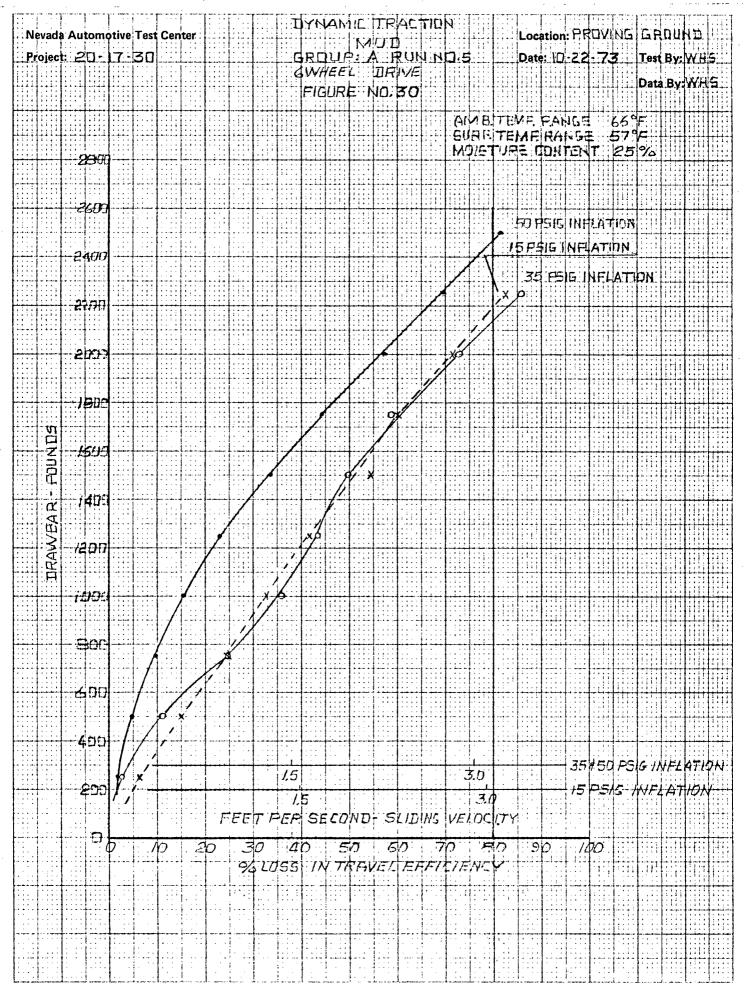
•.					•		• •		
Date: 10-72-73 T	ime:	12:20 PM	Tes	t Vehic	le: <u>M</u>	34 6	x6		
Vehicle Weight, Tru	ck:/	11.536 1	<u> 25 </u>	Trailer	:	S,	Tire Gr	oup:	D
Inflation, psig: 5	0	Ambient	Temp.	°F.:	68	Surface	Temp.	°F.:	5/
Relative Humidity %	<u> </u>	/W:	ind Spe	ed, mph	: <u>7-8</u>	Win	d Direc	tion:	N
•				•				Depth,	
	Mud	Moisture	e Conter	nt, %: 2	5.7	;	3.	9 .	<u> </u>
						:		_	
		· · · · · · · · · · · · · · · · · · ·	Left				Right		
Run Number:	•	1	2	3	4	1.	2	3	4
Tire Track Depth, I	ns.:	3	7/3	5/3		· a	a	1.34	
Tire Track Width, I		10	$\frac{734}{734}$	7/2	-	10/2	-5/1	63/4	
`		10		- 1 - L-		10.2			******
Cone Penetrometer	. 311					_			~_
Readings in Track	6"		-						-
	9"					~			~
•	12"					*		,	-
	15"					·			
•	18"	~~.		·· .					_
	21"							*	
•	24"								
Cone Penetrometer	3"	2	A	2				_	
Readings in	6"		10			$\frac{2}{10}$	- -		
Mud, psi	9"					10		<u>_</u>	
, , ,	12"								
•	15"			-		****			
•	18" -			·				~	
	21"				i			** ***	
	24"		~				***		
		*******						****	************
Plate Penetrometer	3"		_			٠ سب٠			·
Readings in Track,	6"					<u>~~</u>	-		
psi	9"	: ~							
Plate Penetrometer	3"	0	0	0		()	0	0	·
Readings in	6"	0	0			$\overline{\circ}$	<u> </u>	0	
Mud, psi	9"								
, , , , , , , , , , , , , , , , , , , ,		****						************************	
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Comments:									

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Date: 10-22-73 T	'ime: <u>//</u>	2:50 P/	Tes	t Vehic	le: <u>///</u> .=	34 6×	(6		
Vehicle Weight, Tru	ck: 11	,536	<u> </u>	Trailer	:		Tire Gr	oup:	D
Inflation, psig: 2	5 A	mbient	Temp.	°F.:	62	Surface	Temp.	°F.:	62
Relative Humidity %	: <u>3/</u>	W	ind Spe	ed, mph	: 2-3	Win	d Direc	tion:	N
	Mud M	loistur	e Conter	nt, %: 2	25.7	:	Sample 3	Depth,	Inche. 18
			Left 1	Rear			Right	Rear	
Run Number:	. •	1	2	3	4	1	2	3	4
Tire Track Depth, I		63/4	35 7			7/4 8/2	7 ⁷ / ₂		
Cone Penetrometer Readings in Track	3" 6" 9"							*****	Annual Control
	12" 15"		*				Bernald Bernald Bernald		Service Control of th
	18" 21" 24"			*					**************************************
Cone Penetrometer Readings in Mud, psi	3" 6" 9" 12"	<u>5</u> <u>5</u> =	<u> 10</u> .10			<u>5</u> 5	5-10		
	15" 18" - 21"		1 - 144 - 1 - 144 - 1 - 144 - 1 - 144 - 1 - 144						
	24"								
Plate Penetrometer Readings in Track, psi	3" 6" 9"								1 mm
Plate Penetrometer Readings in Mud, psi	3" 6" 9"	0	0		Name Spiriture of Controlled According to Controlled Order Or	<u>0</u>	0		
Comments:		:							

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Date: 10-22-73 T	ime:/	:15 FM	7 Tes	t Vehic	le: <u> //</u>	1.34 6	×6		· · · · · · · · · · · · · · · · · · ·
Vehicle Weight, Tru	ck: <u>//</u>	536	.es'	Trailer	:	<u> </u>	Tire Gr	oup:	D
Inflation, psig:/	5 A	mbient	Temp.	°F.:	68 <u> </u>	Surface	Temp.	°F.:	62
Relative Humidity %	: 32	W	ind Spe	ed, mph	3-75	3 Win	d Direc	tion:	S
	Mud M	loistur	e Conter	nt, %: 2	5.7	;	Sample 3 —	Depth,	Inches
			Left 1	Rear			Right	Rear	
Run Number:	. •	1	2	3	14	1	2	3	4
Tire Track Depth, I Tire Track Width, I		<u>7</u> 8	73 <u>4</u> 7/4			634 7/4	9/2		
Cone Penetrometer Readings in Track	. 3" 6" 9"							******	
	12" 15" 18"								
	21" 24"							****	
Cone Penetrometer Readings in Mud, psi	3" 6" 9"	<u>1</u> 0	10			70	<u> </u>		
•	12" 15" 18"	**************************************				Section Sectio			
	21" 24"				~				
Plate Penetrometer Readings in Track, psi	3" 6" 9"		The same of the sa				The same of the sa		
Plate Penetrometer Readings in Mud, psi	3" 6" 9")	<u>0</u>			<u> </u>			
Comments:									



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Date: 10-22-73 T	ime:	2:25 P/	7 Tes	st Vehic	:le: <u>M-</u>	34 6	Xlo .		,
Vehicle Weight, Tru	ck:	11,531	, LBS	Trailer	·:	7.	Tire Gr	oup:	Α
Inflation, psig: 5	0	Ambient	Temp.	°F.:	70	Surface	Temp.	°F.:	52
Relative Humidity %	:34	W	ind Spe	ed, mph	: <u>6-</u> 22	Win	d Direc	tion:_	W
	•						Sample	Depth,	, Inches
	Mud	Moistur	e Conte	nt, %:			3 24.5	9	18
						;			
			Left				Right		
Run Number:	•		2	3	4	_1	2	3	4
Tire Track Depth, I	ns.:	85	8 %	8 😓	·	74	93	_8';	
Tire Track Width, I	ns.:	73年	71	<u>8</u>		75	8	82	
Cone Penetrometer	. 3"		836	bere.		derig		-	
Readings in Track								~-	
	. 9" 12"	-							
	15"			_		,	***		
	18"								
	21" 24"								
									
Cone Penetrometer	3"	<u> </u>				· <u>: </u>	5		
Readings in Mud, psi	6" 9"			<u>//></u>		_5	_5_	/2	
	12"							-	
1	15"					-	_		
	18" · 21"								
	24"								
•									
Plate Penetrometer Readings in Track,	6" 3"							-	-
psi	9"								
-									***************************************
Plate Penetrometer	`3" 6"	<u> </u>		_2_		<u> </u>	<u> </u>	<u> </u>	
Readings in Mud, psi	911	. ,	•				<u> </u>	<u> </u>	
nud, psi	3	****							
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Comments:						٠.			
comments.									

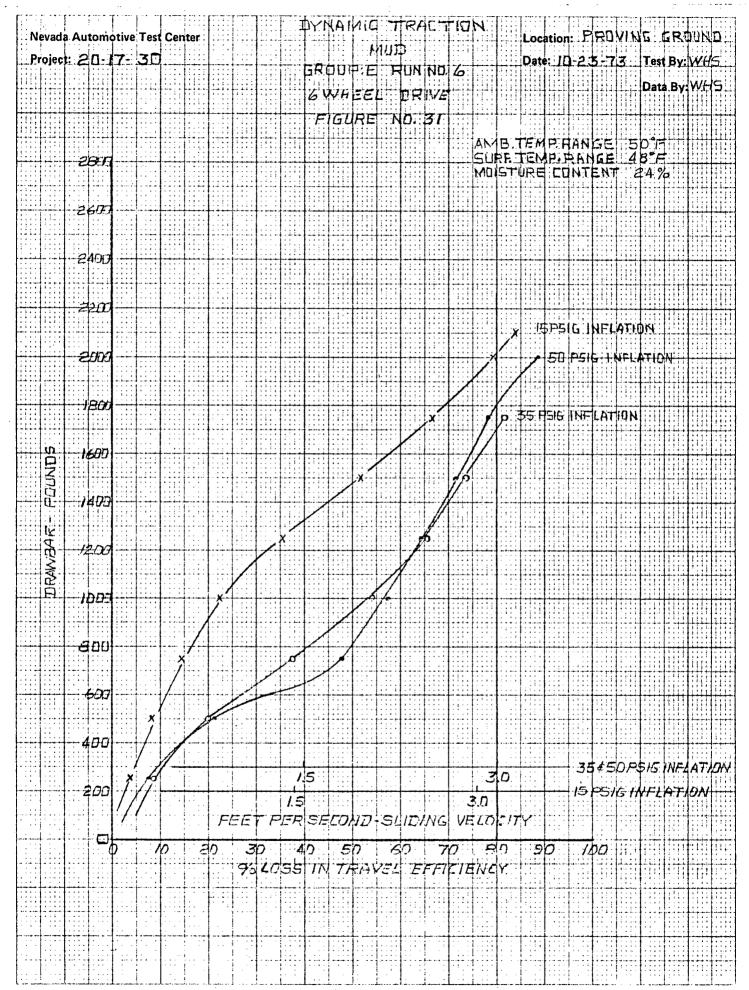
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Date: 10-22-73 T	ime:	2:40 F	Tes	t Vehic	le: 11	34 6	×6		
Vehicle Weight, Tru	ck:	11,536	LES	Trailer	:^	(f)	Tire Gr	oup:	A
Inflation, psig: 3	5	Ambient	Temp.	°F.:	64	Surface	Temp.	°F.:	5 <u>8</u>
Relative Humidity %	: <u> </u>	5 W	ind Spe	ed, mph	6.20	o Win	d Direc	tion:_	W
				,			Sample	Depth,	Inche
						•	3	9	18
	Mud	Moistur	e Conte	nt, %:		; ;	<u> 24.9</u>		
•			Left	Rear			Right	Rear	
Run Number:		1	2	3	4	1	2	3	4
Time Transle Densite of	.	•	0 1	_			- 1	_	
Tire Track Depth, I Tire Track Width, I		<u>9</u> 8/4	95 7/2			8 ¹	91		-
THE HACK WICH, I		(1)2	1/1-						
Cone Penetrometer	, 3 ¹¹			<u> </u>					-
Readings in Track									-
	9"								
•	12"							,	
• • •	15" 18"								
	21"								
	24"	~~							
•		***************************************							
Cone Penetrometer	3"	5	2	-		5	_5		•••
Readings in	611	10	10			10	10	-	
Mud, psi	9"								
	12"								
•	15"	_	-	-					_
	18"								
	21" 24"								
•	24								
Plate Penetrometer	3"	- marin				~~ .			
Readings in Track,							-		
psi	9"		~						
									
Plate Penetrometer	3"	0	_0_			0	_0		
Readings in	6"	0	0			\circ	0	_	_
Mud, psi	9"								
		بنيور سرجة	•						,
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Date // // To 77 T	imat	7117 04	Тор	+ Vohio	ia.	171 /		•	
Date: /0-55-78 T	Tile:	3.13 FM	res	t venic.		1-54 G	5 X 10		
Vehicle Weight, Tru	ck: 1	1.536 1	.RE	Trailer			Tire Gr	oup:	A
Inflation, psig: 1	5	Ambient	Temp.	°F.:	62	Surface	Temp.	°F.:	57
Relative Humidity %	:	<u> </u>	ind Spe	ed, mph	6-2	o Win	d Direc	tion:	W
							Sample	Depth,	Inche
	Mud	Moistur	e Conte	nt. %:	2 4.9	:	3_	9 .	<u>18</u>
						:		***************************************	
	•		Left	Rear			Right	Rear	
Run Number:	. •	1	_2	3	4	1	2	3	4
Tire Track Depth, I		94	9 			. <u>8 1</u>	10		
Tire Track Width, I	ns.:	<u>5</u>	734			_2_	_ <u>න</u>		
Cone Penetrometer	. 3"								
Readings in Track	· 6" 9"								
•	12"						-	'	
	15" 18"								
	21" 24"					•			
	24								
Cone Penetrometer Readings in	3" 6"	3				<u> </u>	2		
Mud, psi	9"	_5_	_5_			_5_			
	12" 15"						_		
•	18"								
	21" 24"								
					<u> </u>				
Plate Penetrometer Readings in Track,	3" 6"					. — .			
psi	9"								
late Penetrometer	311	0				. 0_	_ 🔿	No. of	
Readings in	611 911	0	0			0	0	***	
Mud, psi	3								
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Comments:	



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Date: 10-23-73 T	ime:_	:0:55 A	<u>//</u> Tes	t Vehic	le: <u>//</u>	-34 6x	6		
Vehicle Weight, True	ck:	11:36	435	Trailer	:		Tire Gr	oup:	E
Inflation, psig:	2	Ambient	Temp.	°F.:5	50	Surface	Temp.	°F.:_4	7
Relative Humidity %	. 5	56 W.	ind Spe	ed, mph	: 6-18	Win	d Direc	tion:	Λ
						•	Sample	Depth,	Inche
	Mud	Moisture	e Conter	nt, %: 2	?3.5	;	3	9	<u>18</u>
						;			
•			Left 1	Rear			Right	Rear	
Run Number:	. •	1	2	3	4	1	2	3	ц
Tire Track Depth, In Tire Track Width, In		7 ³ /4 8/4	7 8 ³ 4			73/4	<u>9</u> 8		
Cone Penetrometer Readings in Track	. 3" 6" 9"							-	
	12" 15"								**************************************
	18" · 21" 24"					•			
Cone Penetrometer Readings in Mud, psi	3" 6" 9"	-5	- 2			5	<u>5</u> -		
	12" 15" 18"				91100 91100 None,				
, ·	21" 24"								
Plate Penetrometer Readings in Track, psi	3" 6" 9"		5						The state of the s
late Penetrometer Readings in Mud, psi	3" 6" 9"	<u></u>	<u></u>			<u> </u>			
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Comments			
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TEST	DATA	

Date: 10-23-73 T	ime:	11:20 F	M Tes	t Vehic	:le:_ <i>M</i>	.34 6	×6	•·	
Vehicle Weight, Tru					٠.		Tire Gr	oup:	E
Inflation, psig: 7	•				***		Temp.	°F.:	48
Relative Humidity %							•		
					V		•	Depth.	
	Mud N	loistur	e Conter	n+ %. '	೧೭೮	:	3	9_	18
				,		;			<u>-</u>
		Left Rear				*****	Right Rear		
Run Number:	. •		2	3	4	<u> </u>	2	3	4
Tire Track Depth, I		8/3	<u>5</u>			3/2	<u> 9/1</u>		
Tire Track Width, I	ns.:	7311	8			<u>84</u>	7/2	1	thest
Cone Penetrometer	3"		,	C TOP					
Readings in Track	6" 9"			* **	F-9-1	NIJAK PROB		**** ,	***
	12"					*		,	
	15" 18"					*.1	****	***	*
	21"						An 1	1774	
•	24"								
Cone Penetrometer	3"	4	_5				2.	•	
Readings in Mud, psi	6" 9"	10	_5_			10	_/2_		941
nau, psi	12"					,			
	15"								
	18"		***						
	21"				· · · · · · · · · · · · · · · · · · ·				
	24"							*********	
Plate Penetrometer	3"		10.00	_		inga.	Maria .		* equ
Readings in Track,	6"	~~				, an	~··		4-13
psi	9"		v. <u>.</u>				\		
Plate Penetrometer	3"				***		<u>्र</u> भ		
Readings in	6"		<u> </u>			(*)			
Mud, psi	9"		1 /20						
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									:
Comments:									

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Date: 10-23-73 T	ime:	11:45	AM Tes	t Vehic	le: <u>/</u>	1.3.1	6×6		
Vehicle Weight, Tru	ick: <u>//</u>	536 LE	<u>S</u>	Trailer	: <u>//</u>	<u> </u>	Tire Gr	oup:	-
Inflation, psig:_/	5	Ambient	Temp.	°F.:	<u>51</u>	Surface	Temp.	°F.:_4	48
Relative Humidity %	: <i>_</i>	2 W	ind Spe	ed, mph	5-20	> Win	d Direc	tion:_	W
								Depth,	
•	Mud	Moistur	e Conte	nt, %: 2	3.5	:	3	9 .	<u> </u>
						;	-		
·			Left	Rear			Right	Rear	
Run Number:	. •	1	2	3	4	1	2	3	4
Tire Track Depth, I	·na .	7/8	84		_	· 74	773		
Tire Track Width, I		8	7/4			8/4	-//3		
TILE HACK WILLING I			174			(D) (A)			
Cone Penetrometer	, 3"	-		e espe					
Readings in Track	. 6 "								
,	9"	top 4							
	12"	*****							
	15"	. , .					*****		
	18"		***						
•	21"		,, 4 n				•		×44
•	24"								
Cone Penetrometer	3"	5				7	Z	i	
Readings in	6''	10	<u>5</u> 10			70	-		
Mud, psi	`g''					<u> 10</u>	_/0_		
, po-	12"								
	15"	_					****		
•	18"					******	-	-	
	21"								
	24"	~~					•		

Plate Penetrometer	3"	_				٠ ست	بينين	_	
Readings in Track,	6"							~~	****
psi	9"						***		~
Plate Penetrometer	· 3"	0	\circ			0	0		
Readings in	6"	0	0	 ,	~	0	0		
Mud, psi	9"								
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Nevada Automotive Test Center		DYNAKTIE		ы	Locat	ion: PROVING	GROUND
Project: 20-17-30		GROUP: G	ם ט או אטא	7	Date:	(D-2 3-73	Test By: WH5
		6WHIEEL	DRIVE				Data By: WH5
		FIGURE	NO.32				
				5	WE, LEN VRF TEN	VIP. HANGE V.E. RENGE E. CONTENT	54°A
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1600 N. 1200		x	10				
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Date: 10 07 77 77	:	1100 0	Too.	w Wahim		420	1 11		
Date: 10 23 73 T	ıme:	1,25 P	in les	t venic.	re:	134 ((a) X (a)	·	
Vehicle Weight, Tru	ck:	11536	<u> 792</u>	Trailer		<u>A)</u>	Tire Gr	oup:	G
Inflation, psig: _ S	0	Ambient	Temp.	°F.: <u>£</u>	4	Surface	Temp.	°F.:_ <i>£</i>	52
Relative Humidity %	:	<u> </u>	ind Spe	ed, mph	6-7.7.	Win	d Direc	tion:_	W
								Depth.	Inch
	Mud 1	Moistur	e Conter	nt, %: 2	5. 3	:	3	9 .	18
						;			
• ,			Left 1	Rear			Right	Rear	
Run Number:	٠٠.	1	2	3	4	1	2	3	4
Tire Track Depth, I Tire Track Width, I		63 ₄ 10	73/4	73 <u>4</u>		7/2 93/4	<u>9</u> 7/4	9/4	
Cone Penetrometer Readings in Track									
	9" 12"	27.4					***	\$40 to 1	1 n up
	15" 18" 21" 24"					•			
Cone Penetrometer Readings in	3" 6"	2	70	4		. 5	7.		
Mud, psi	9" 12"			<u>//0</u> 					
	15" 18" · 21"		* ************************************	No.					
	24"								
Plate Penetrometer Readings in Track, psi	3" 6" 9"								
late Penetrometer Readings in Mud, psi	3" 6" 9"	0	<u>0</u> <u>0</u> =	<u>O</u> .		0	0	0	

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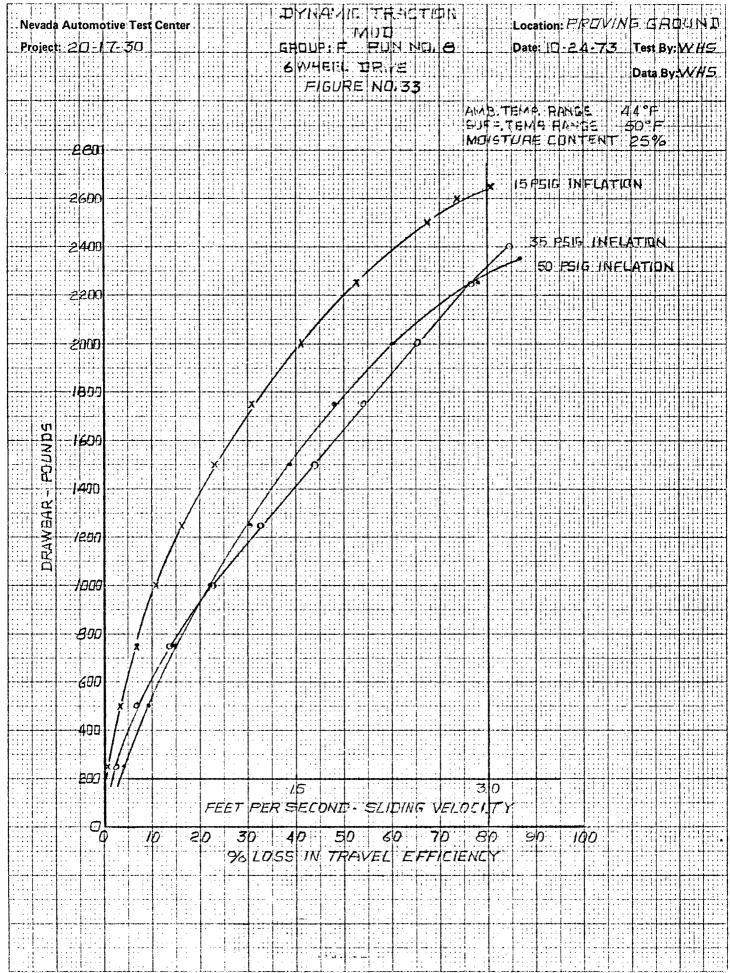
- 10 00 TO MI		50.04	Tost	Vohicl	· 147	tut /	× 6	•	
Date: 10-23-73 Ti									-
Vehicle Weight, Truc									
Inflation, psig: 35	Aml	bient	Temp. °	F.: <u>5</u>	<u>5</u> S	urface	Temp. o	F.:	14
Relative Humidity %:	44	Wi	ind Spee	d, mph:	6-20	Win	d Direct	ion:	<u> </u>
							Sample		
							3	9 .	18
	Mud Mo	isture	Conten	t, %: Z	5,3	: ;			
	. *		Left R	ear			Right F	lear	
Run Number:		1	2	3	4	1	2	3	4
Kuit Nambet .					-				
Tire Track Depth, In	ıs.:	7/1	75/3	<u> </u>			<u> </u>		
Tire Track Width, In	ıs.: _	9	7/1			8/2	7/4		
								·	
Cone Penetrometer	. 3"								
Readings in Track	6" <u> </u>	*****							-
	12"						_		
•	15"						,		
	18" -	~							
	21"								
	24"	·					Man.		
Cone Penetrometer	3"	.5	J."				_ <u>2</u>		
Readings in	6"	10	,)		*-	7:0	<u> </u>		
Mud, psi	9"			-					
•	12"								
•	15"				~-				
	18"	,							
:	21"				••••				
	24"								
·	211		,						_
Plate Penetrometer	3" 6" -						برد سرد		
Readings in Track,	9" -								
psi	9" -								
Plate Penetrometer	311	Ω	0			0_	0_		
Readings in	6"					,··)	70		
Mud, psi	9"	~~							
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elative Humidity %:_	42	W:	ind Spec	ed, mph.	: 6-70) Wind	a Di		
				· •		H 111	n priec	tion:	W
							Sample	Depth,	
	Mud Moi	sture	Conter	nt, %: 2	<i>=</i> 7 ·	:	3	9	<u> </u>
	,,,,,,	.ocur c	. conten	10, 0. 2	5,3	;	******		
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ın Number:		1	2	3	4	1	2	3	4
									
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Date: 10-24-73 1									
Vehicle Weight, Tru	ick: //	526 C	25 !	Trailer	:	Ą	Tire Gr	oup:	<u> </u>
Inflation, psig:	<u>50</u> A	mbient	Temp.	PF.:	<u> </u>	Surface	Temp.	°F.:	36
Relative Humidity	6: 64	<u> </u>	ind Spec	ed, mph	<u>0-3</u>	Win	d Direc	tion:_	W
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Readings in Track, psi	, 6" 9"								
Plate Penetrometer	. 3"	<u></u>			***************************************				
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Vehicle Weight, True	ck:	11536	<u>125</u>	Trailer	:/	<i>(l</i>	Tire Gr	oup:	F
Inflation, psig:	15	Ambient	Temp.	°F.:	44	Surface	Temp.	°F.:	50
Relative Humidity %	·5	<u>9</u> W	ind Spe	ed, mph	0-	Z Win	d Direc	tion:	W
							_	Depth,	
	Mud	Moistur	e Conte	nt, %: 2	5,5	:	3	9 -	18
			Left	Doam		;	Right	Poam	
Run Number:	_	1	2	3	4		2	3	4
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Tire Track Width, In	ns.:	7/4	71/4			73/4	71/2		
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Cone Penetrometer Readings in Track	. 3" 6"								
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	12"								
	15"		_	_					
•	18"								
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			Left 1	Rear			Right 1		
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Tire Track Width, I		8/4	7	~		8	73/4		
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Readings in Track							-		
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nuu, psi	12"								
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Plate Penetrometer	3"	-		_			÷÷		
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Inflation, psig: 50 Relative Humidity %:	Ambient	Temp. Gind Spec	of.:	<u> </u>	Surface	Temp. d Direc	or.:	స్త్ W Inche
Relative Humidity %:	50 W	ind Spee	ed, mph	. <u>0</u> -0		d Direc Sample	tion:	\mathcal{W} , Inche
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		Left F	Rear			Right	Rear	
Run Number:	1	2	3	4	1	2	3	4
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Figure No. 35

Rolling Resistance - Prepared Mud

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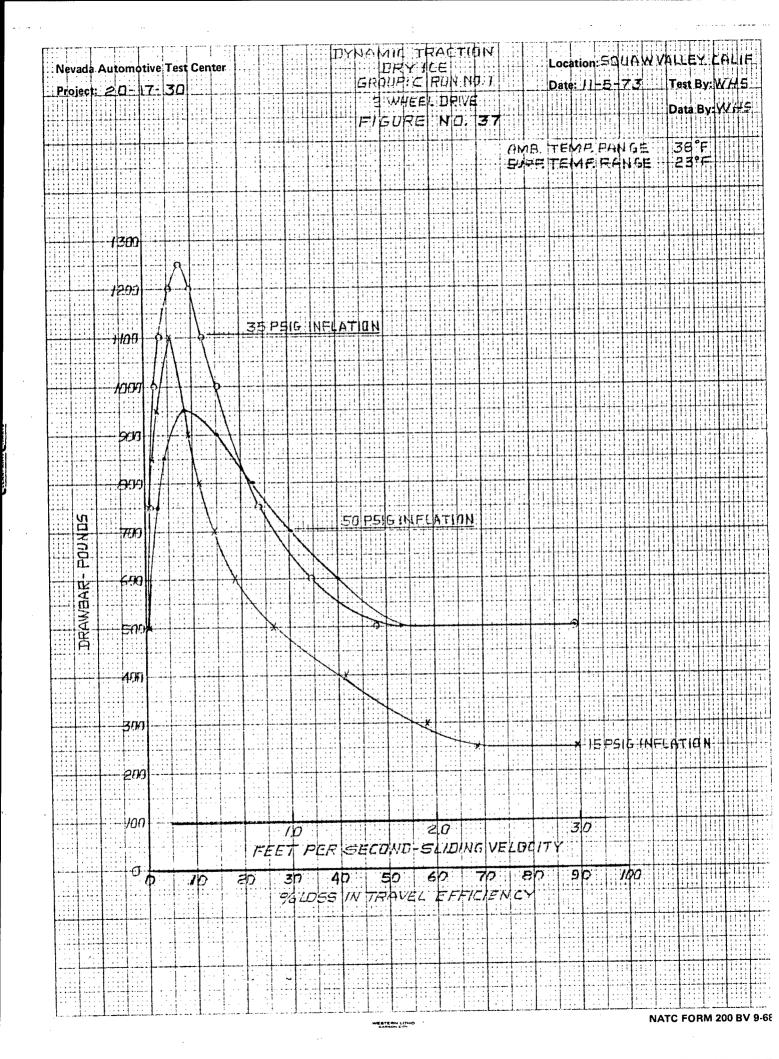
Figure No. 36

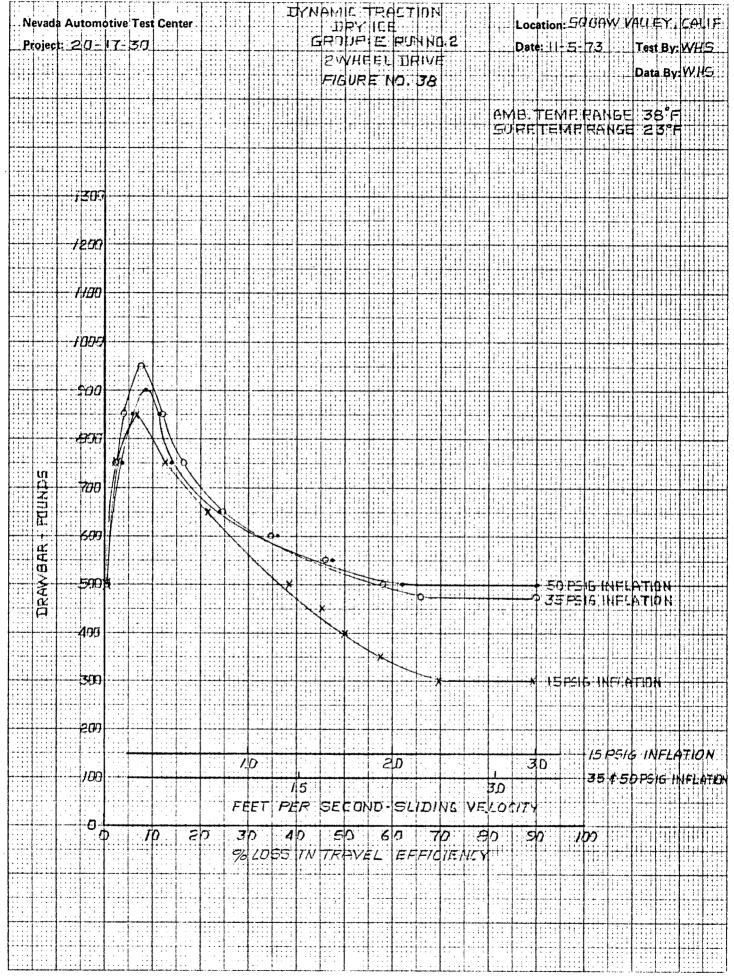
Dynamic Traction Summary - Dry Ice

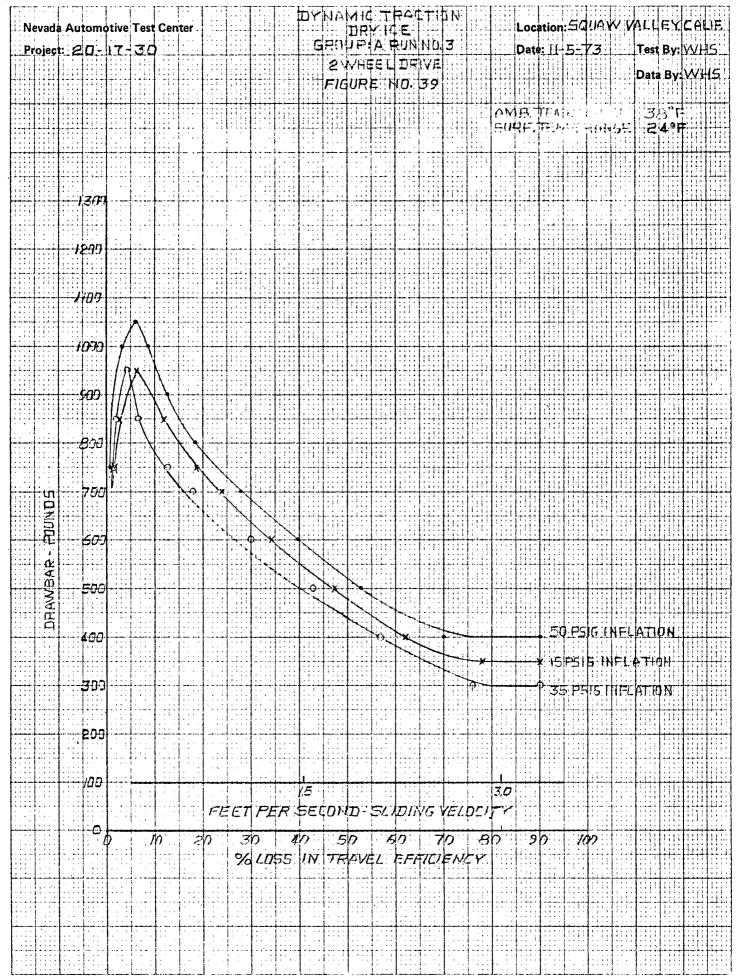
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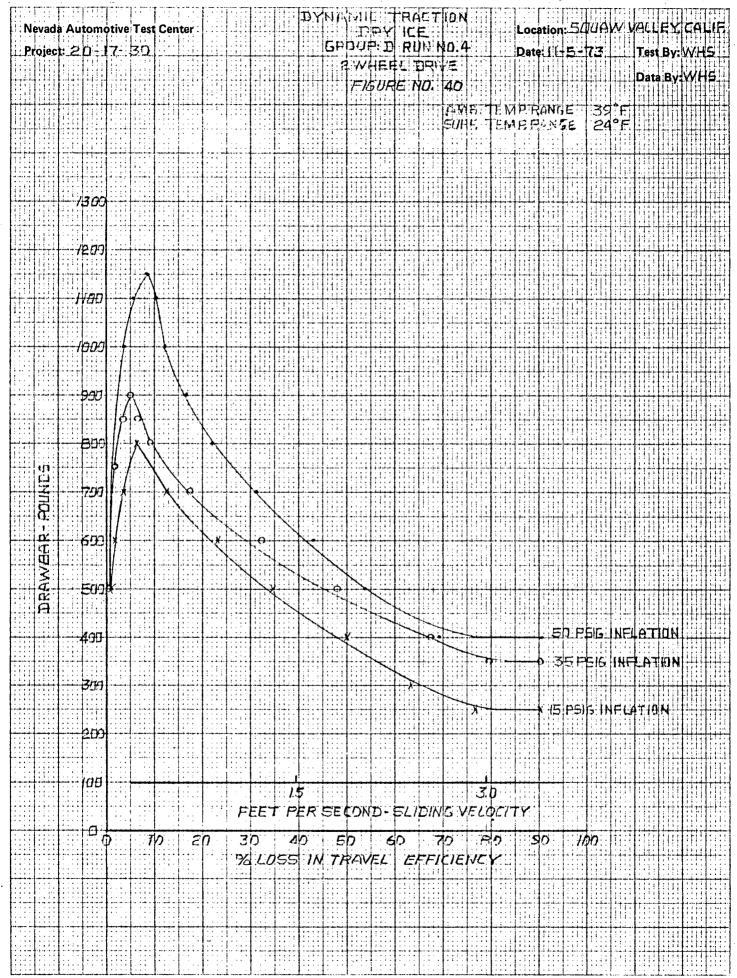
Figures 37 through 45

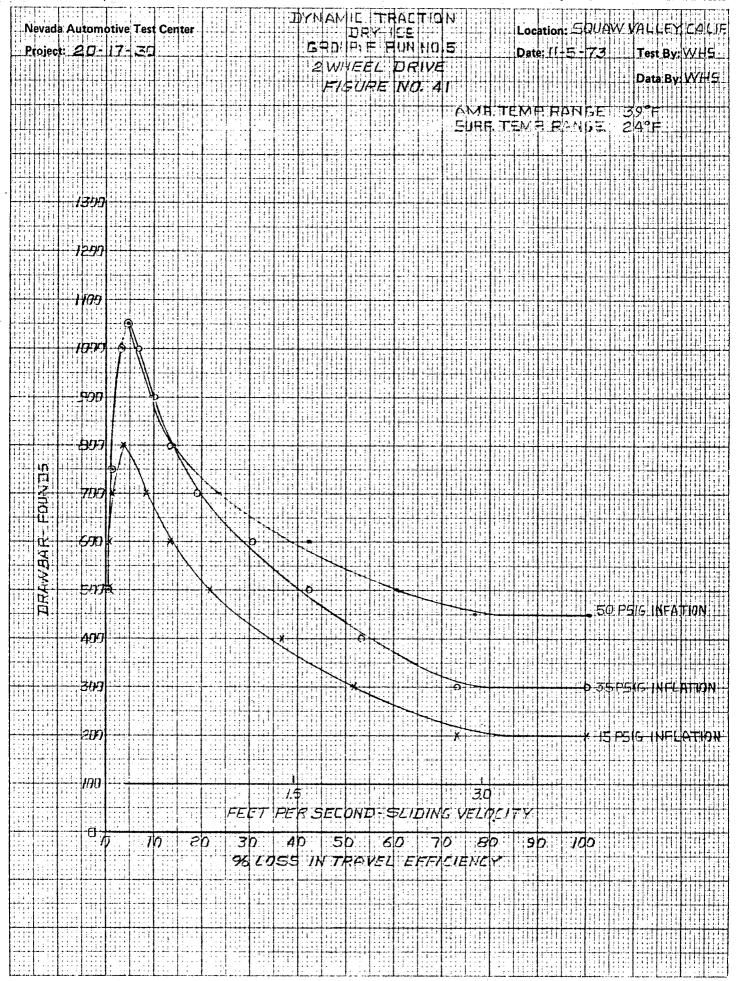
Dynamic Traction - Dry Ice

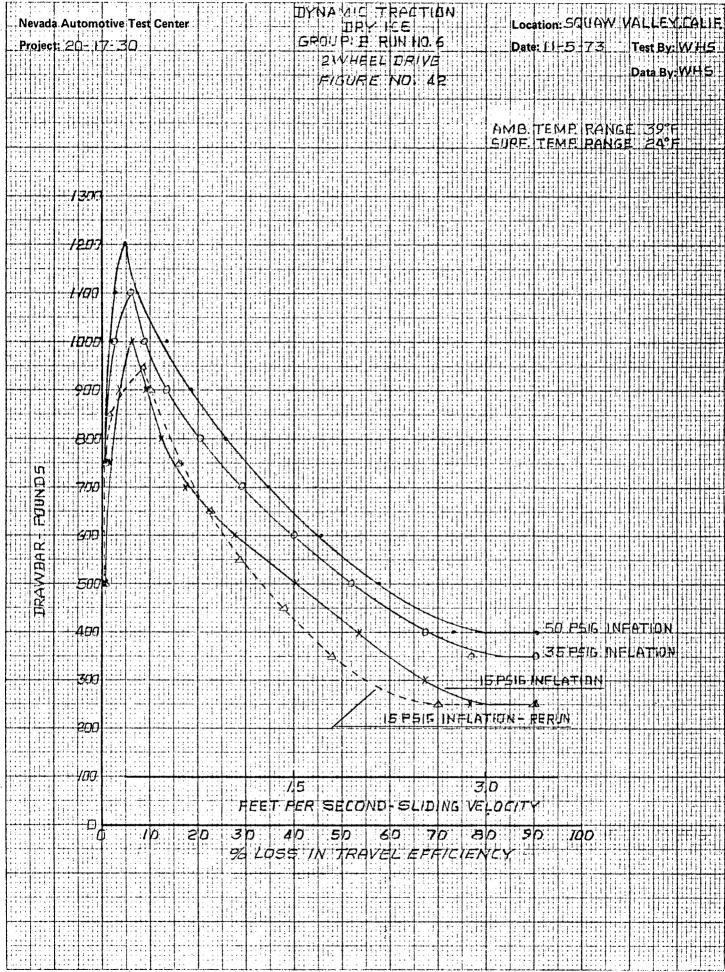




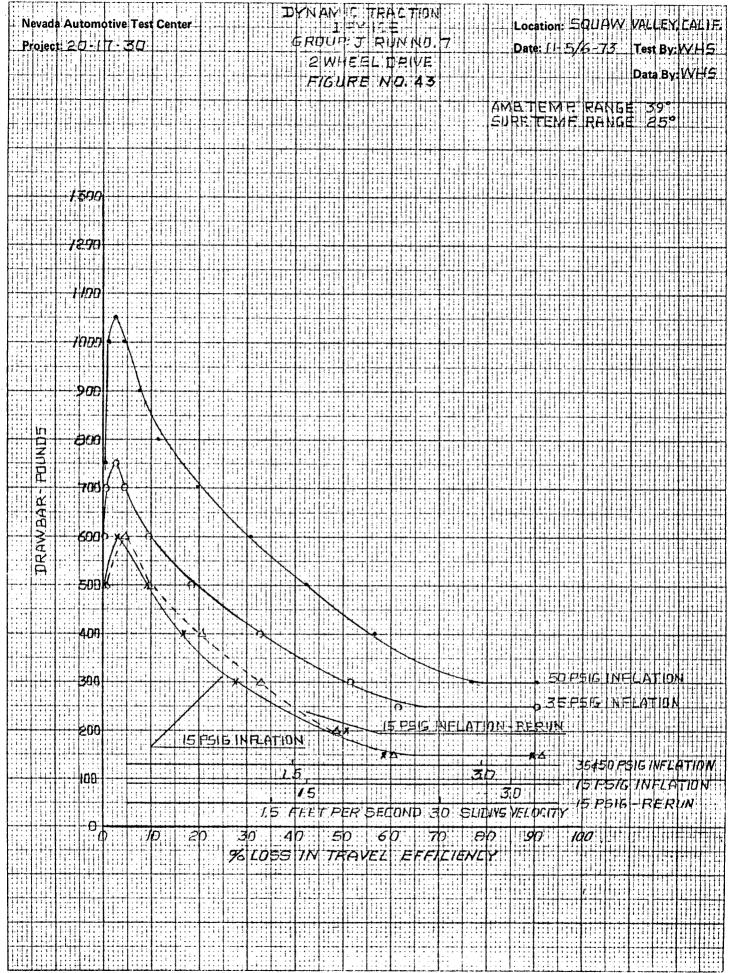


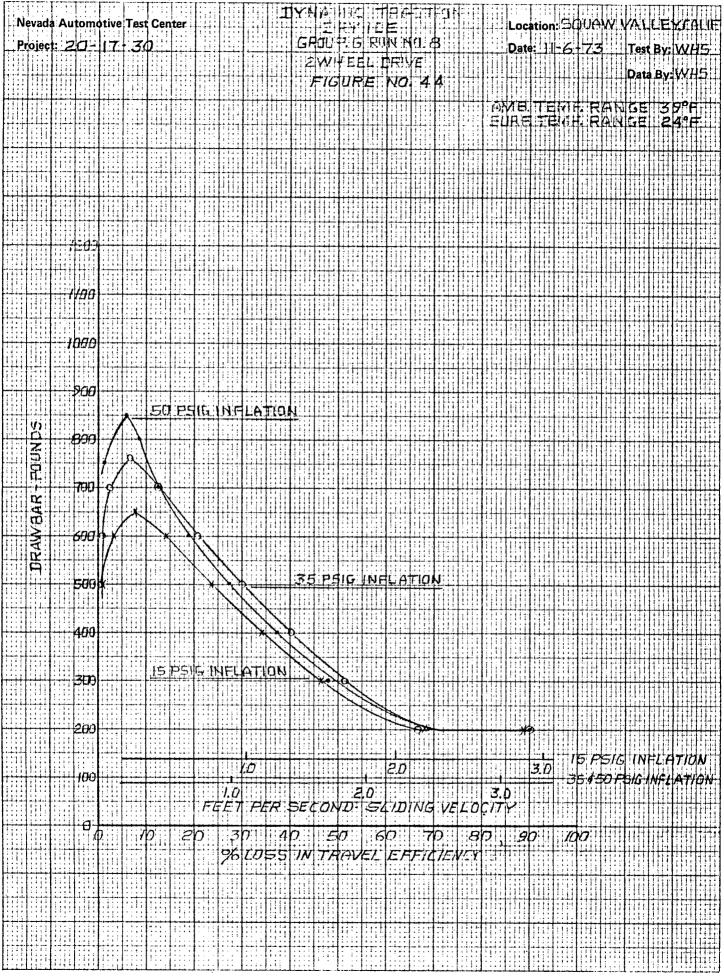






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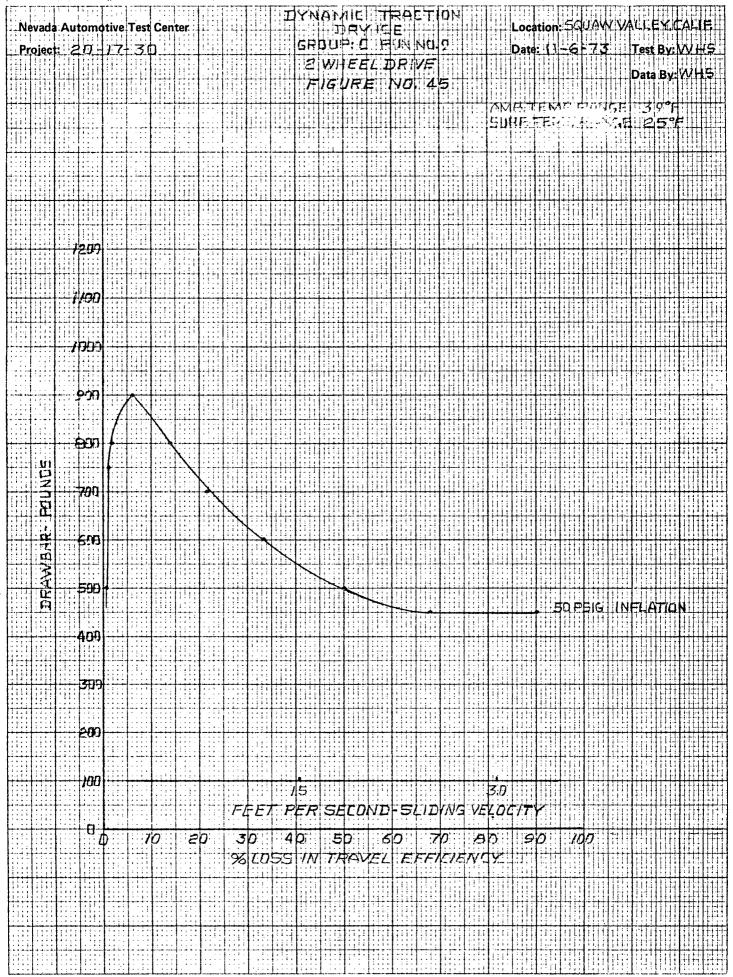


Figure No. 46

Rolling Resistance - Dry Ice

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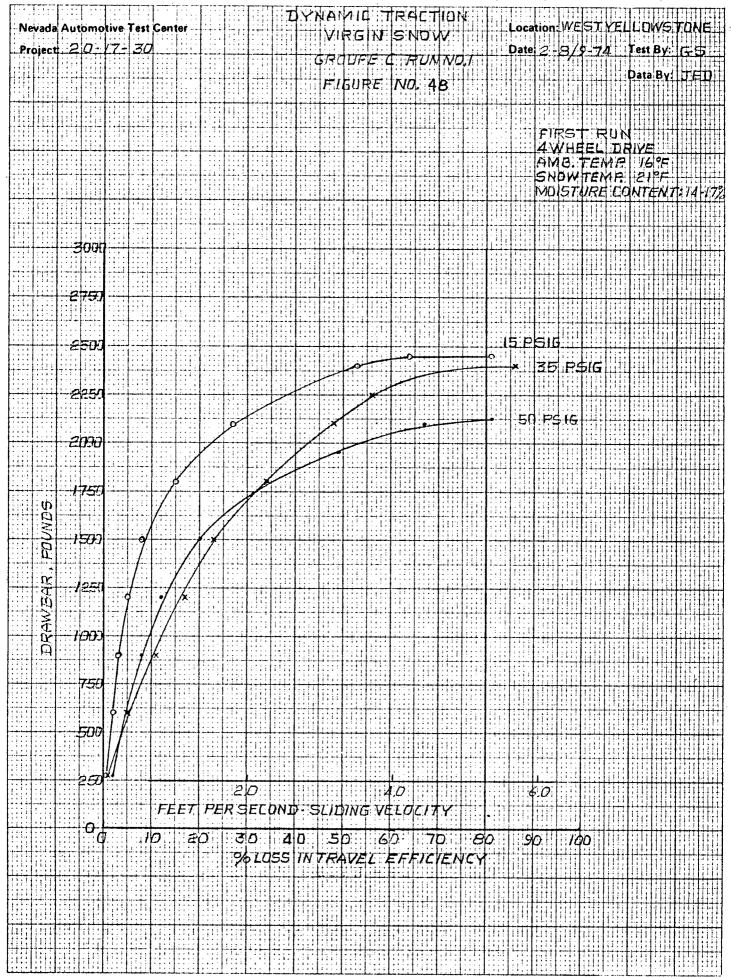
Figure No. 47

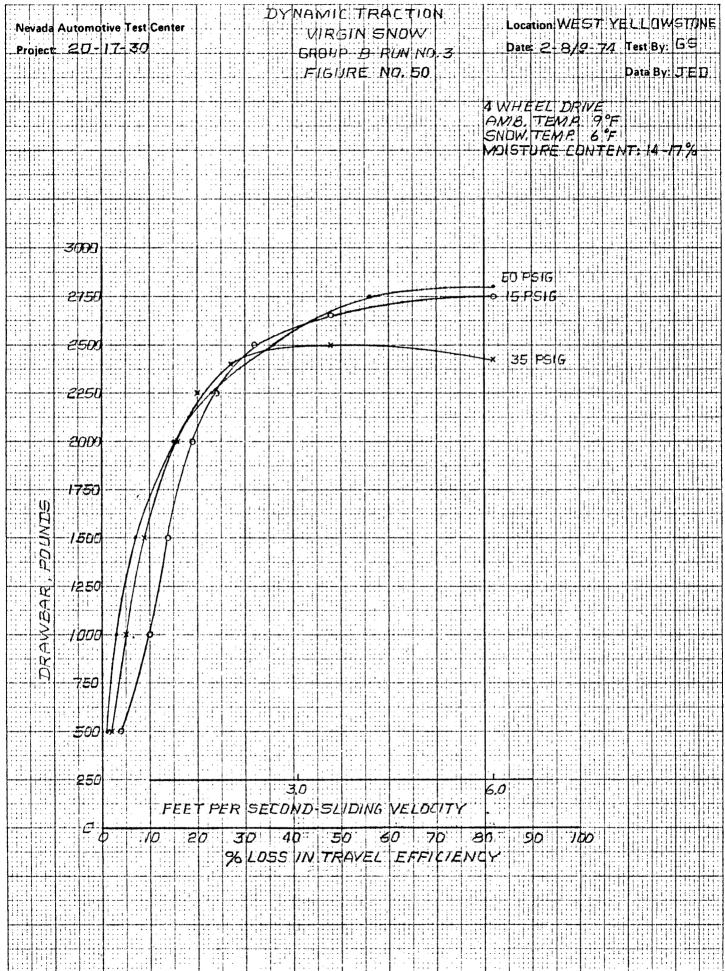
Dynamic Traction Summary - Virgin Snow

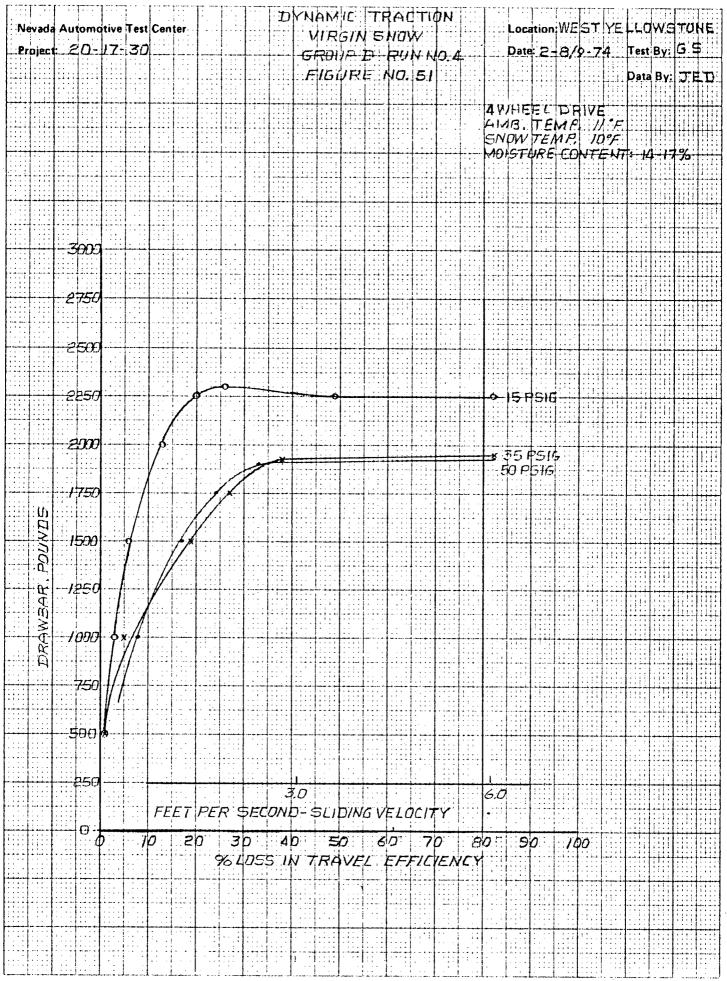
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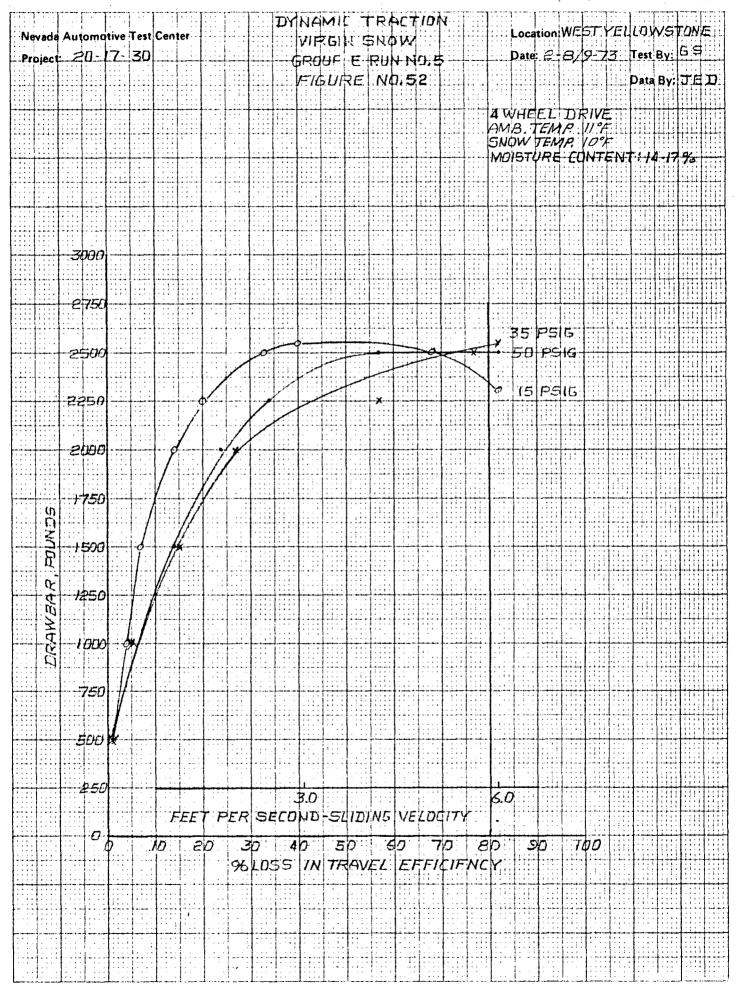
Figures 48 through 56

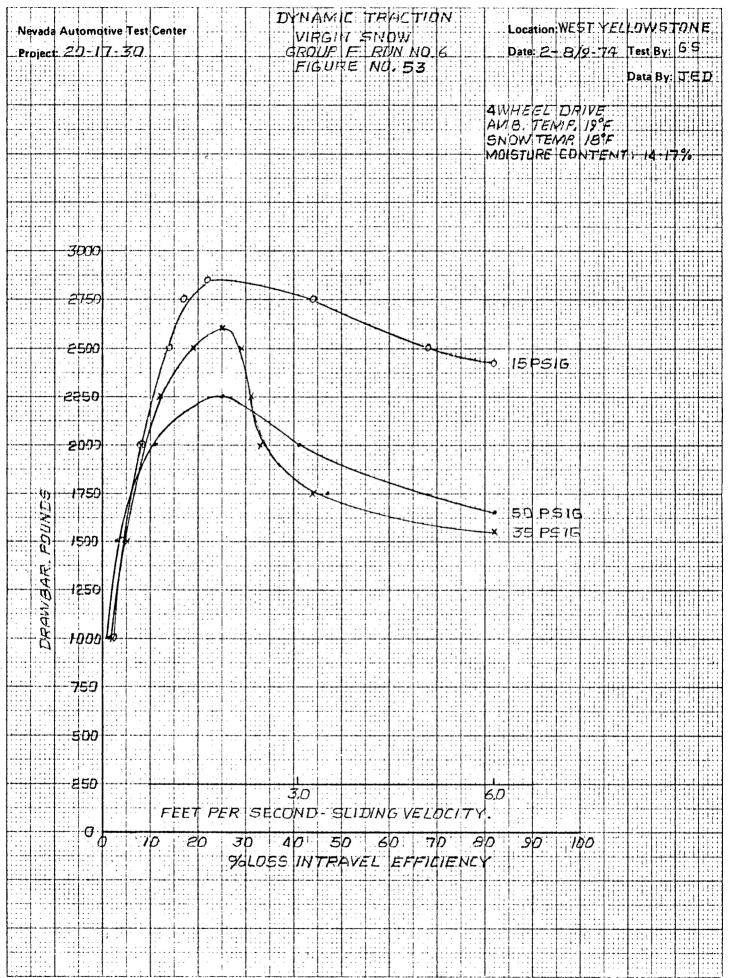
Dynamic Traction - Virgin Snow

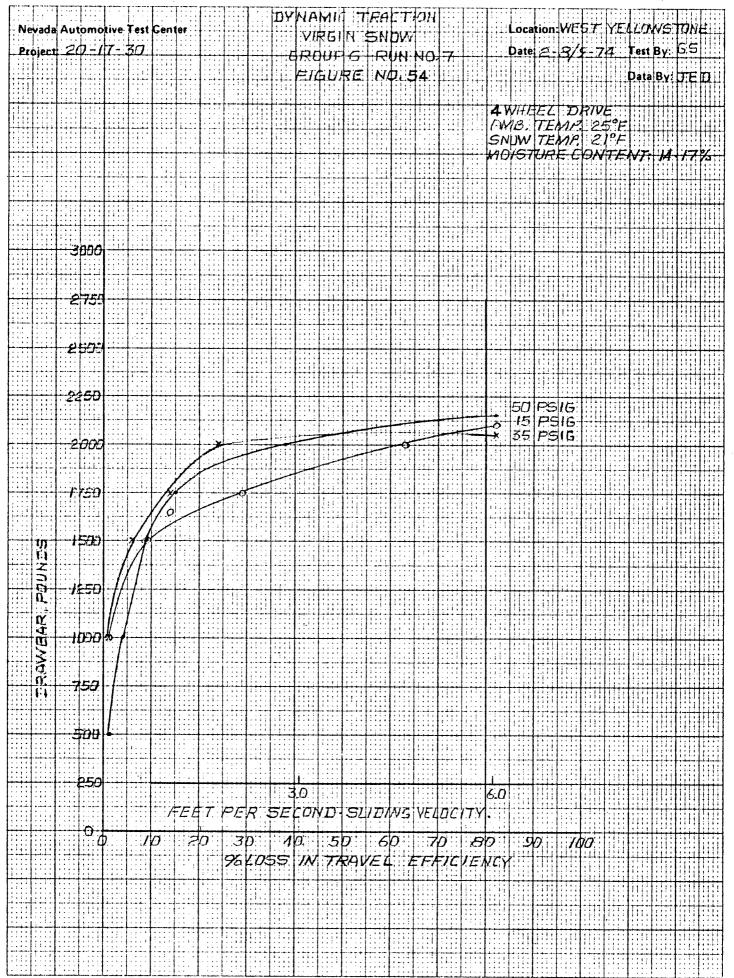












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Figure No. 57

Rolling Resistance - Virgin Snow

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Figure No. 58

Dynamic Traction Summary - Hard Pack Show

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Figure Nos. 59 through 67

Dynamic Traction - Hard Pack Snow

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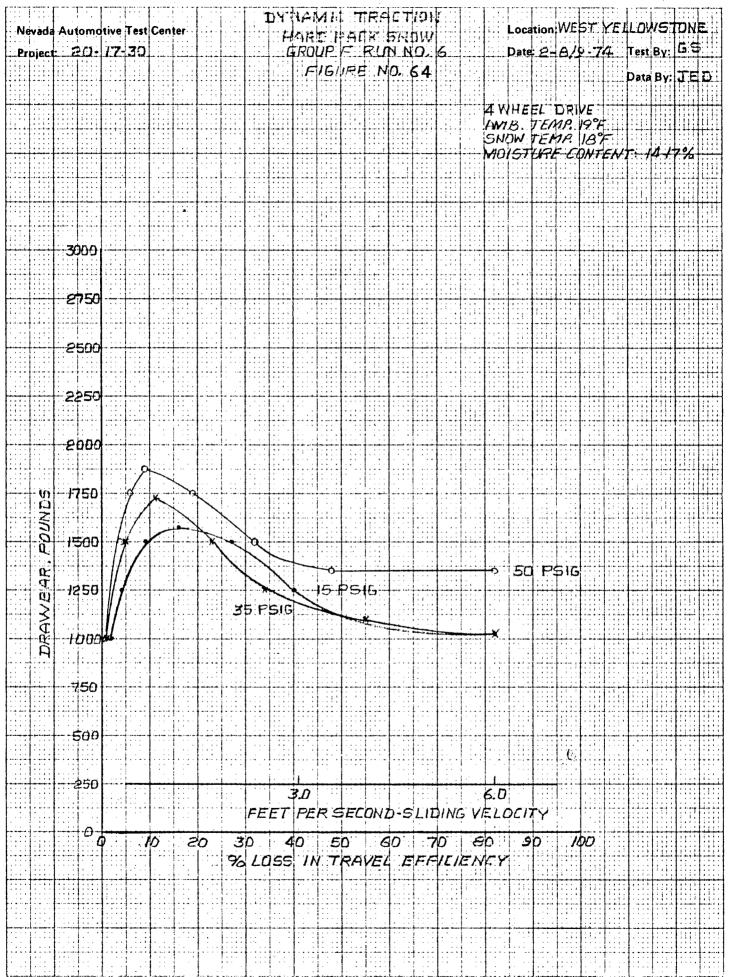
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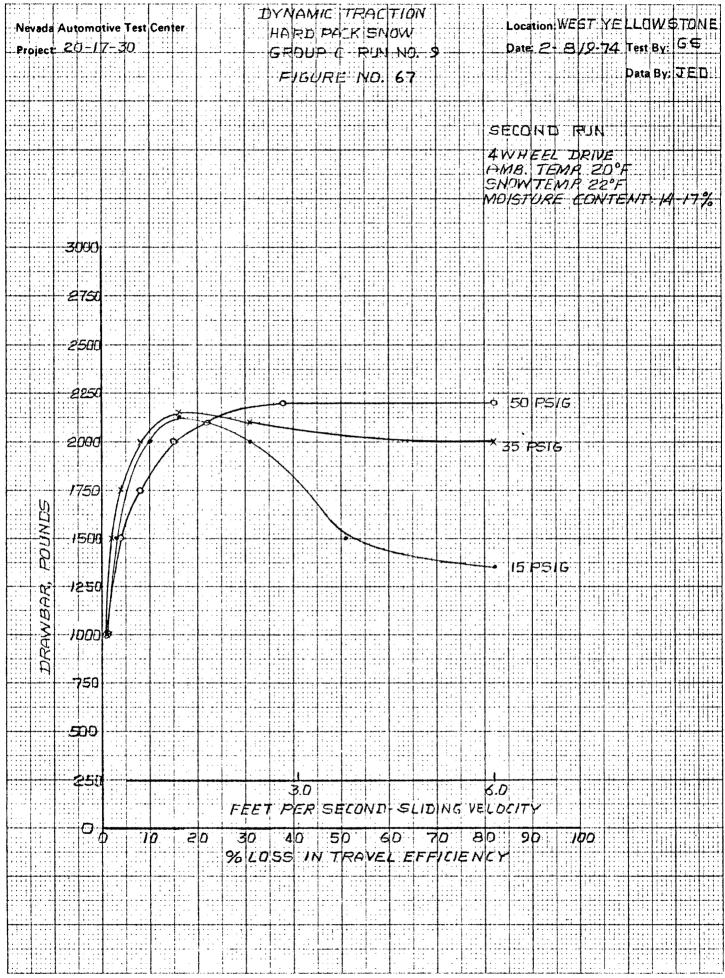


Figure No. 68

Rolling Resistance - Hard Pack Snow

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Figure No. 69

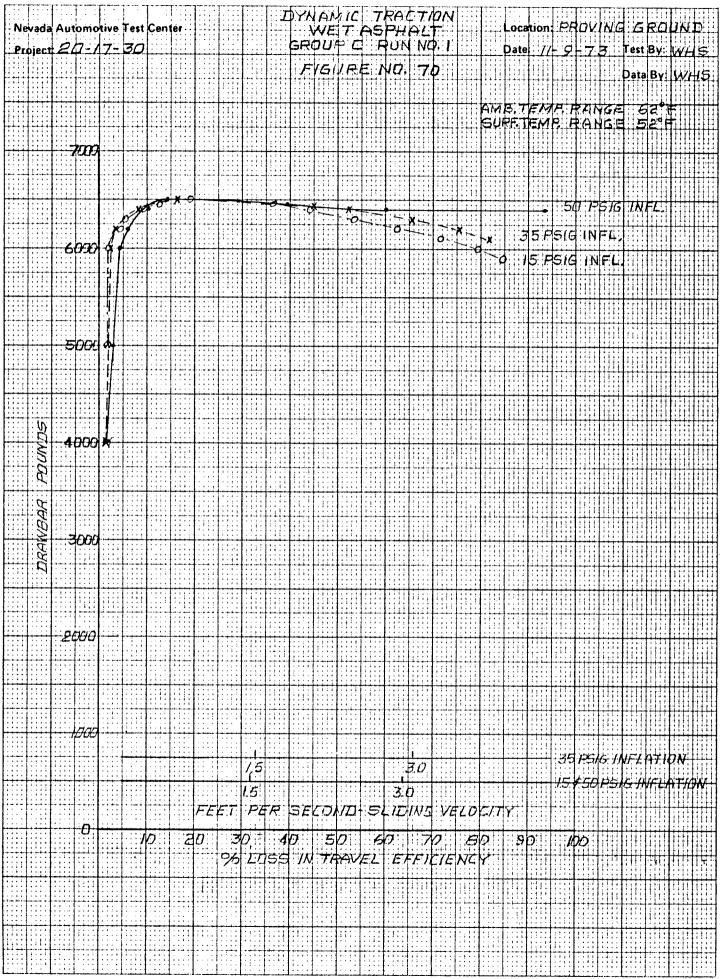
Dynamic Traction Summary - Wet Asphalt

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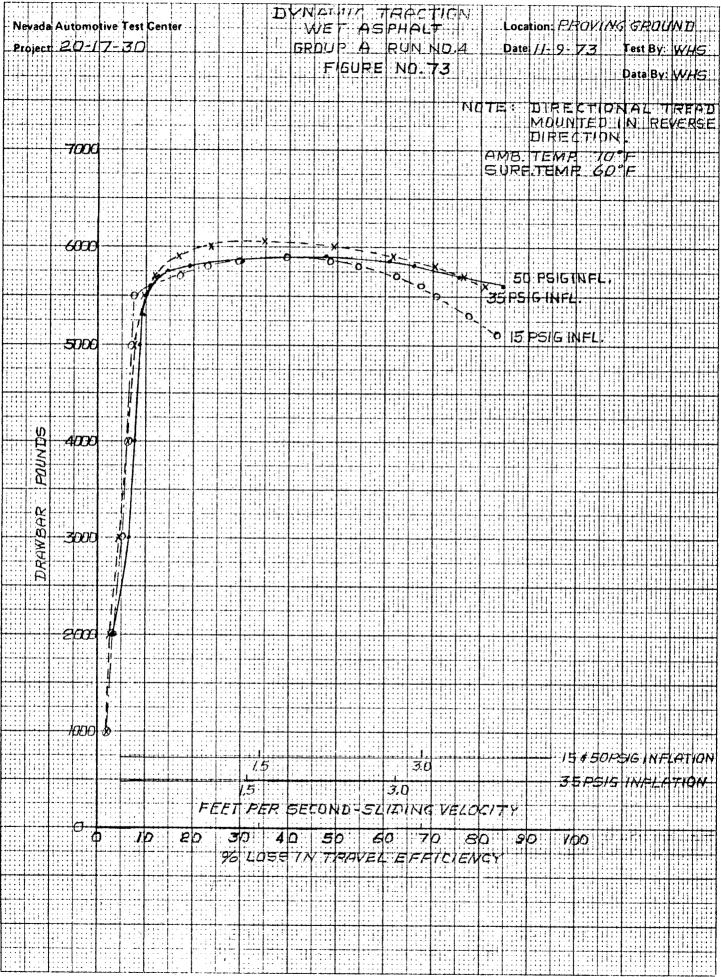
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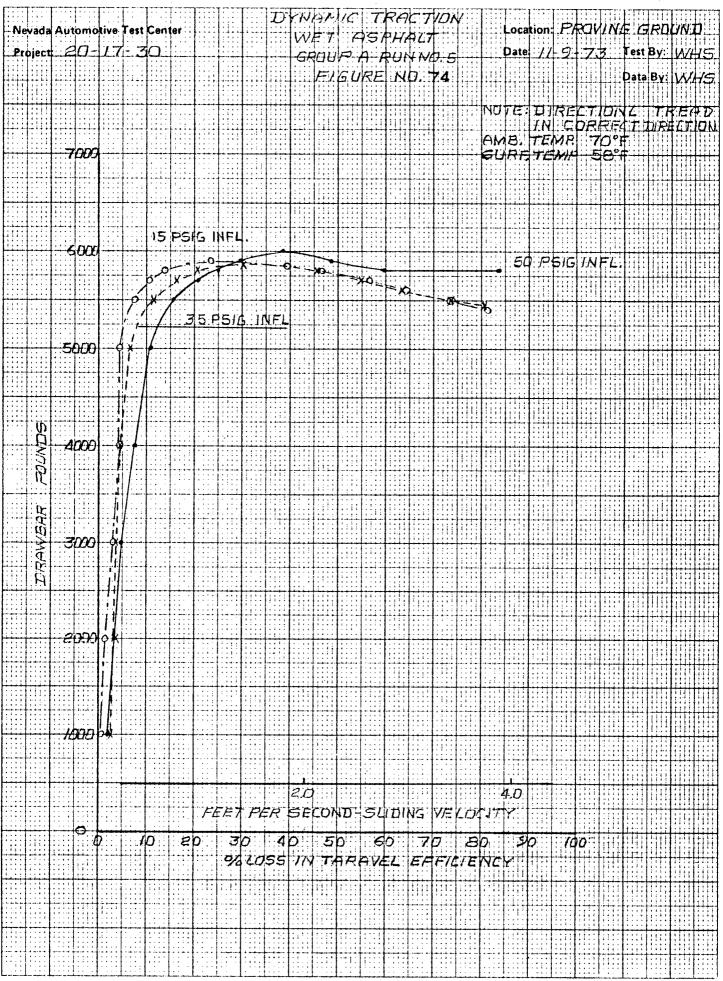
Dynamic Traction - Wet Asphalt

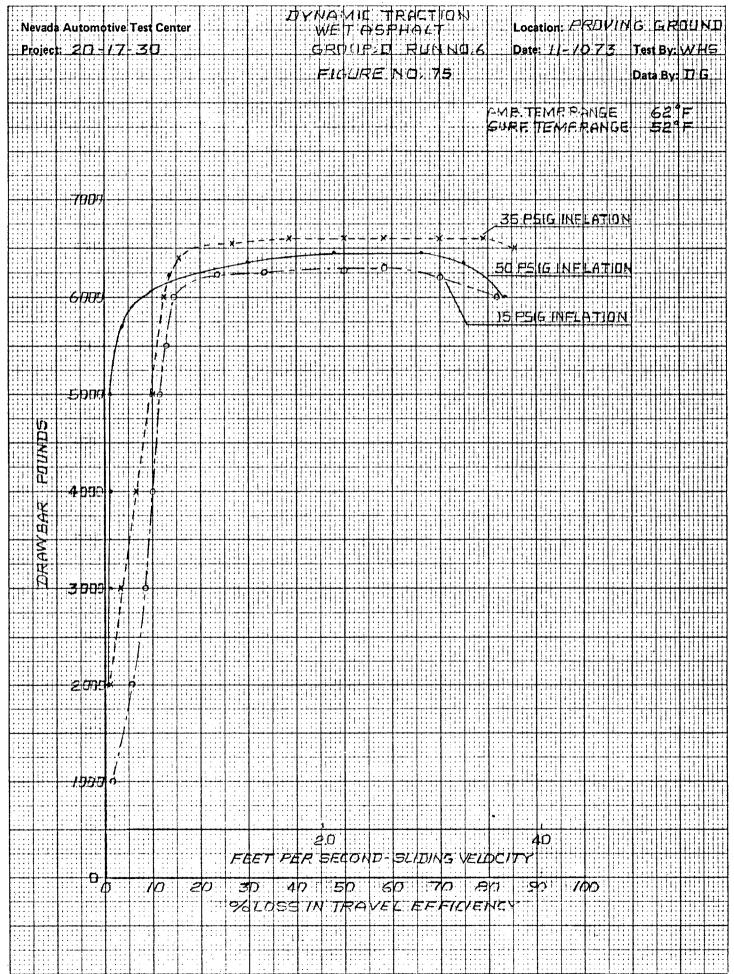


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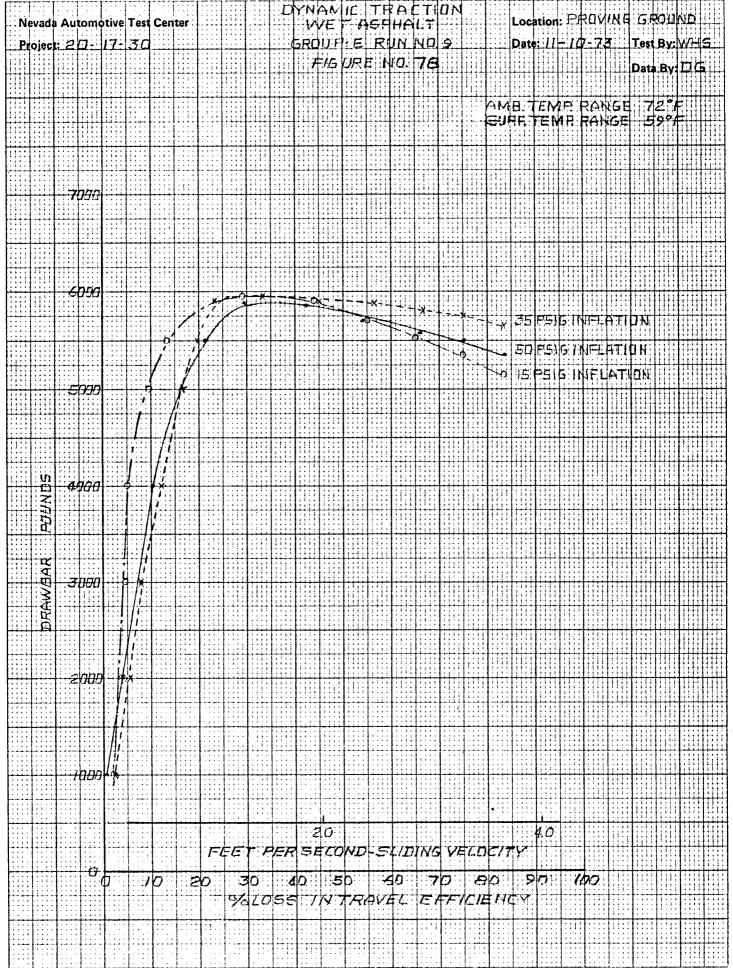






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Figure No. 82

Dynamic Traction Summary - Packed Clay

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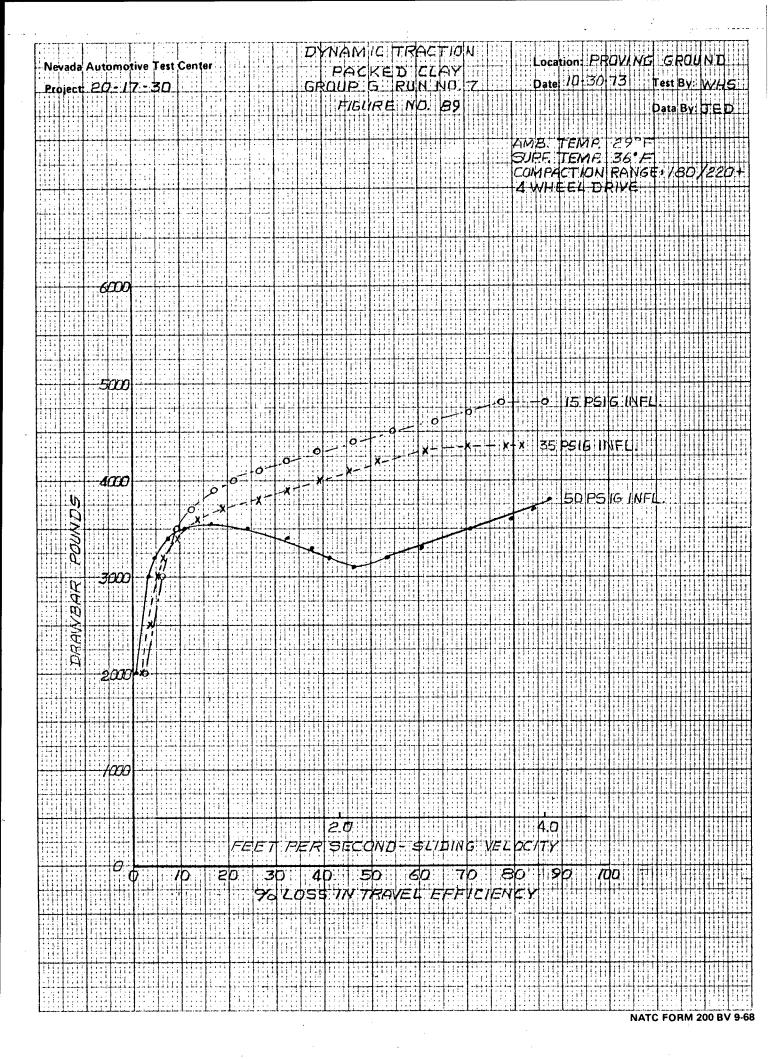
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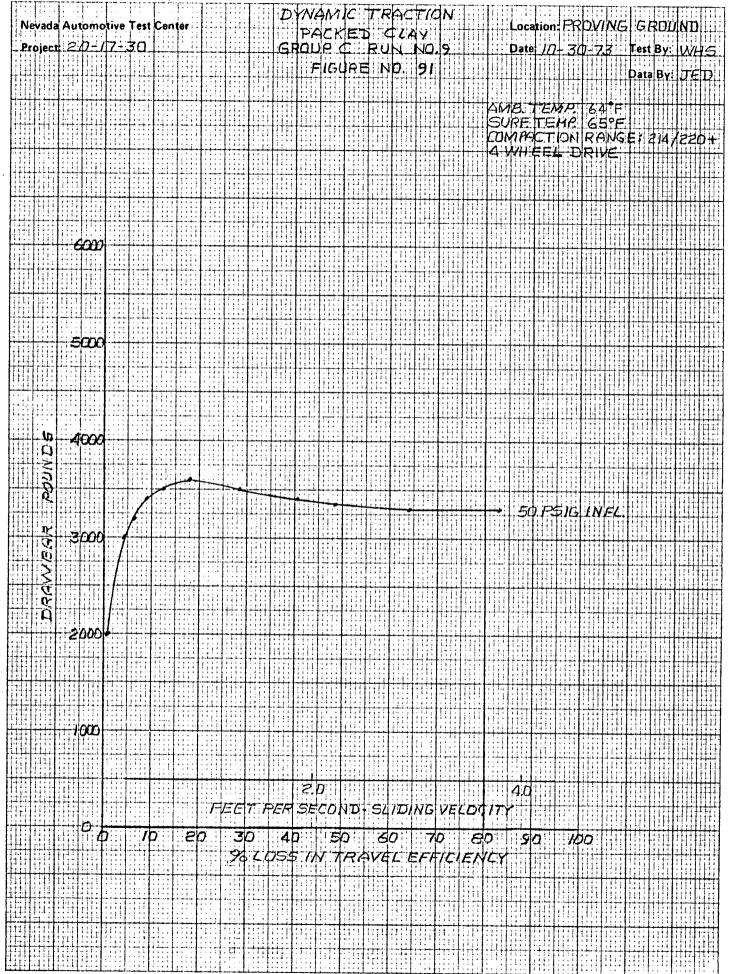


Figure No. 92

Rolling Resistance - Packed Clay

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Figure No. 93

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Figure Nos. 94 and 95

Braking Summaries

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Wet Asphalt

30-0 mph 4-Wheel Braking

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щ Д	DCLR Ft/Sec.	14.7	15.3	12.2	12.9	12.2	13.8	12.2	12.2	14.7	
7.5-0 MPH	Dist. Feet	:	#	ស	ស	ស	±	ഹ	ഗ	ⅎ	
,-	Time Sec.	0.75	0.72	06.0	0.85	06.0	0.80	06.0	06.0	0.75	
Hdw	DCLR Ft/Sec. ²	11.0	11.2	11.6	11.6	11.0	10.5	10.5	12.9	11.0	
15.0-7.5 MPH	Dist. Feet	17	16	16	16	17	17	17	71	17	
•	Time Sec.	1.00	0.98	0.95	0.95	1.00	1.05	1.05	0.85	1.00	
Hd. M	DCLR Ft/Sec. ²	10.5	11.0	10.0	11.0	10.0	10.5	10.0	10.5	9.6	
22.5-15.0 MPH	Dist. Feet	29	28	30	28	30	29	30	29	32	
. 22	Time Sec.	1.05	1.00	1.10	1.00	1.10	1.05	1.10	1.05	1.15	
H di H	DCLR Ft/Sec. ²	12.9	11.6	11.0	11.0	10.5	10.5	10.5	11.0	12.2	
30.0-22.5 MPH	Dist. Feet	33	37	33	9 8	0 †	0 †	0 #	33	35	
30.	Time Sec.	0.85	0.95	1.00	1.00	1.05	1.65	1.05		06.0	
Avg. DCLR	30-0 MPH	12:3	12.3	11.2	11.4	10.9	11.3	10.8	11.7	11.8	
Meas. Time	Stop, Sec.	3.65	3.65	3,95	3.80	4.05	4.55	4.10	3.80	3.80	
Calc. Dist. To	Stop, Feet	83	82	06	88	82	06	92	87	88	,
Meas. Dist.	Stop, Feet	79	48	87	85	68	83	06	84	85	
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Ory Ice

9-0 mph Braking

Нd	DCLR Ft/Sec. ²	0.91	0.61	0.91	0.91	0.91	1.21	0.91	0.91	0.91
2.25-0 MPH	Dist. Feet	m m	8	ო	ო	თ	#	ო	ິຕ	ო
.2	Time Sec.	1.70	1.50	2.00	2.00	1.90	2.20	1.90	1.90	1.80
МРН	DCLR Ft/Sec. ²	3.33	3.33	3.03	3.64	3.64	3.33	3.64	49.E	3.64
4.50-2.25 MPH	Dist. Feet	11	11	10	12	12	11	12	12	12
77	Time Sec.	2.20	2.20	2.10	2.50	2.50	2.20	2.40	2.40	2.50
Н Б	DCLR Ft/Sec. ²	6.06	7.88	5.76	98.36	7.58	6.97	7.27	7.27	7.88
6.75-4.50 MPH	Dist. Feet	20	26	13	21	25	23	24	24	26
6.7	Time Sec.	2.45	3.10	2.30	2.50	3.00	2.80	2.90	2.90	3.20
МРН	DCLR Ft/Sec. ²	11.80	11.20	84.8	60.6	10.60	10.60	10.60	9.39	10.60
.0-6.75	Dist. DCI Feet Ft/8	33	37	28	30	35	35	35	31	ი ა
ő	Time Sec.	3.35	3.20	2.40	2.60	3.00	3.00	3.00	2.70	3.00
Avg. DCLR	9-0 MPH	5.52	5.76	4.55	5.00		5,53	5.61	5.30	5.76
Meas. Time	Stop, Sec.		10.00		9.60	10.40	10.20	10.20	06.6	10.50
Calc. Dist. To	Stop, Feet	73	76	09	99	75	73	74	70	76
Meas. Dist. To	Stop, Feet	7.1	75	9	65	73	7.1	74	69	75
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DCLR - Deceleration

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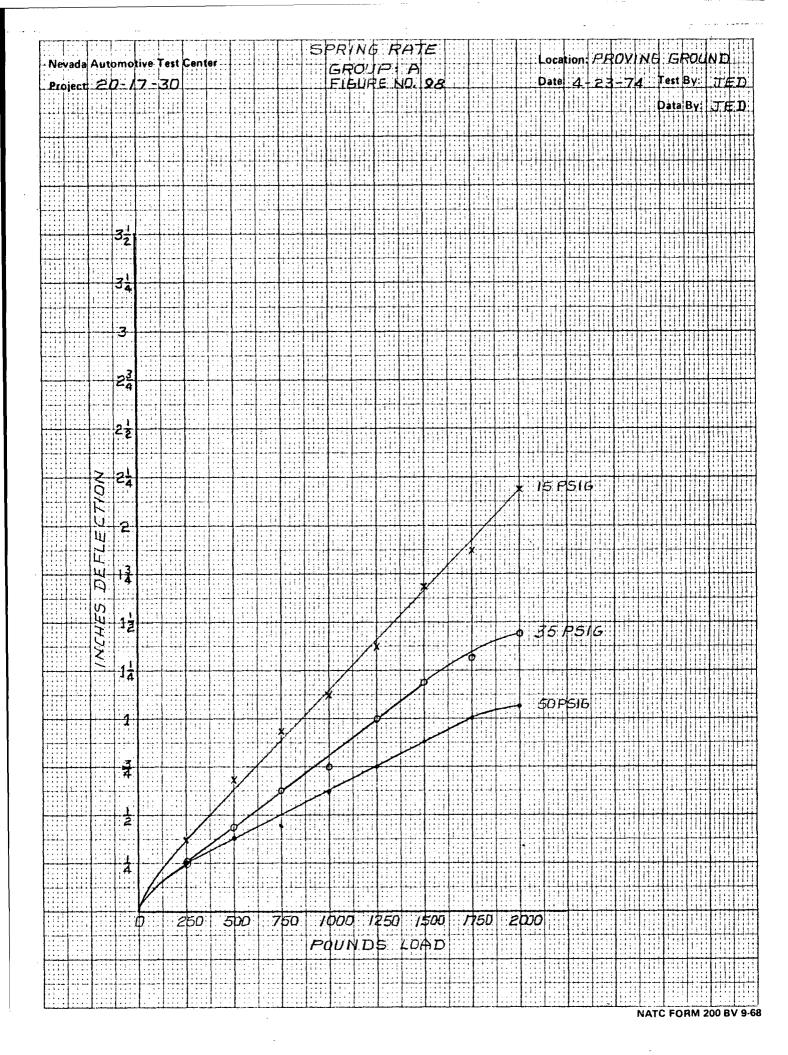
Figure Nos. 96 through 105

Spring Rates

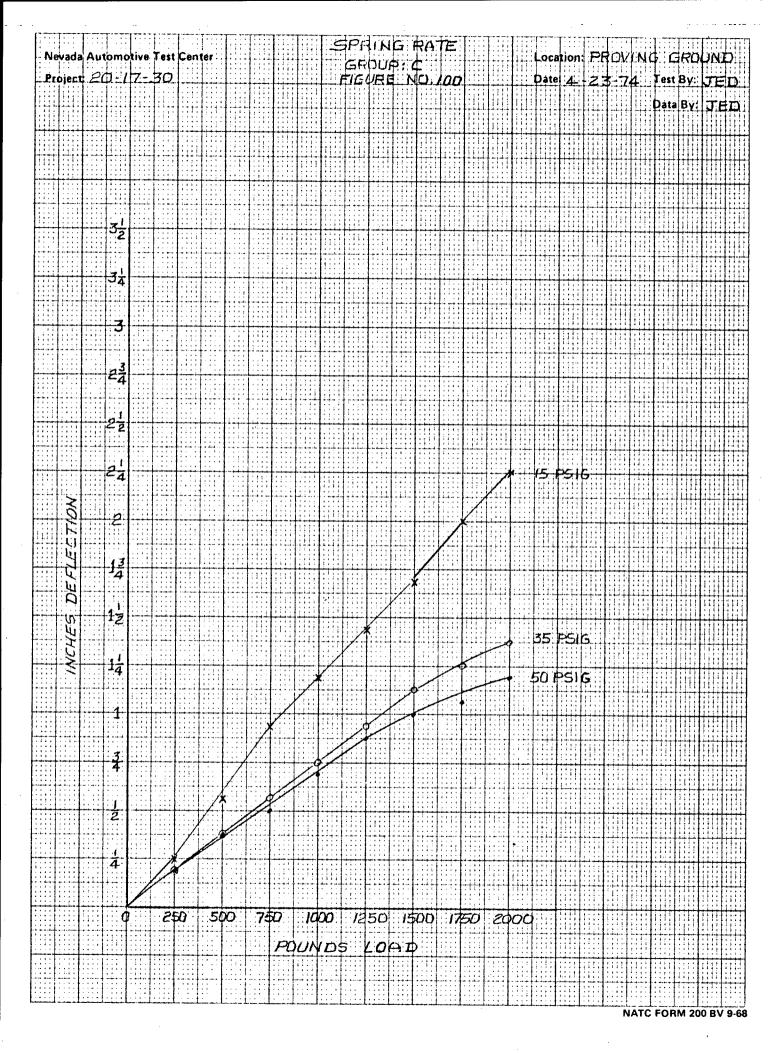
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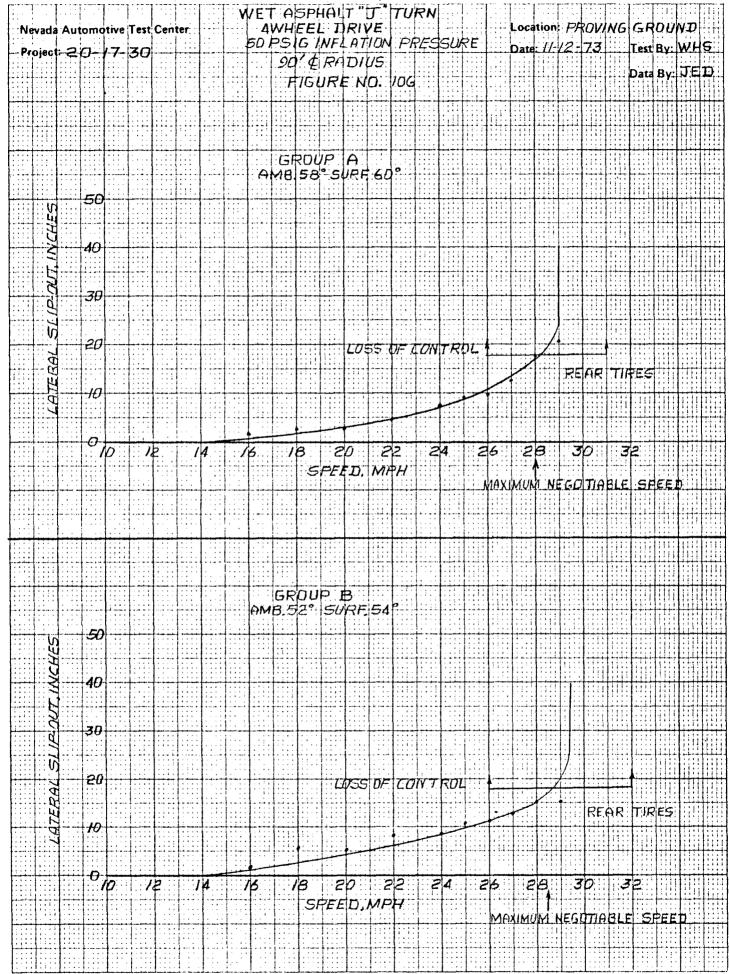
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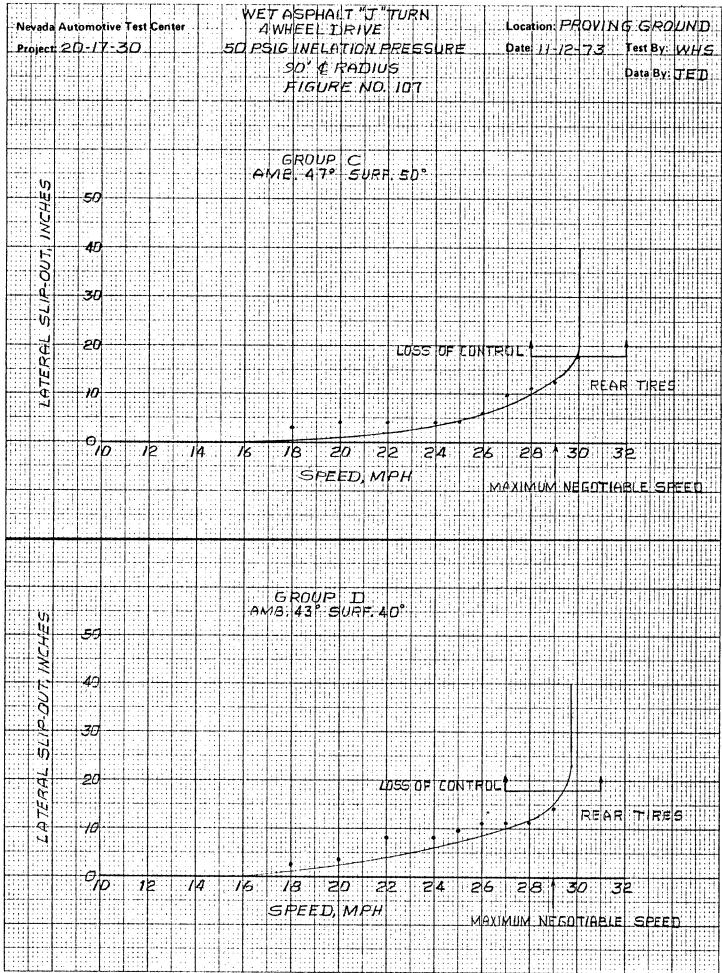
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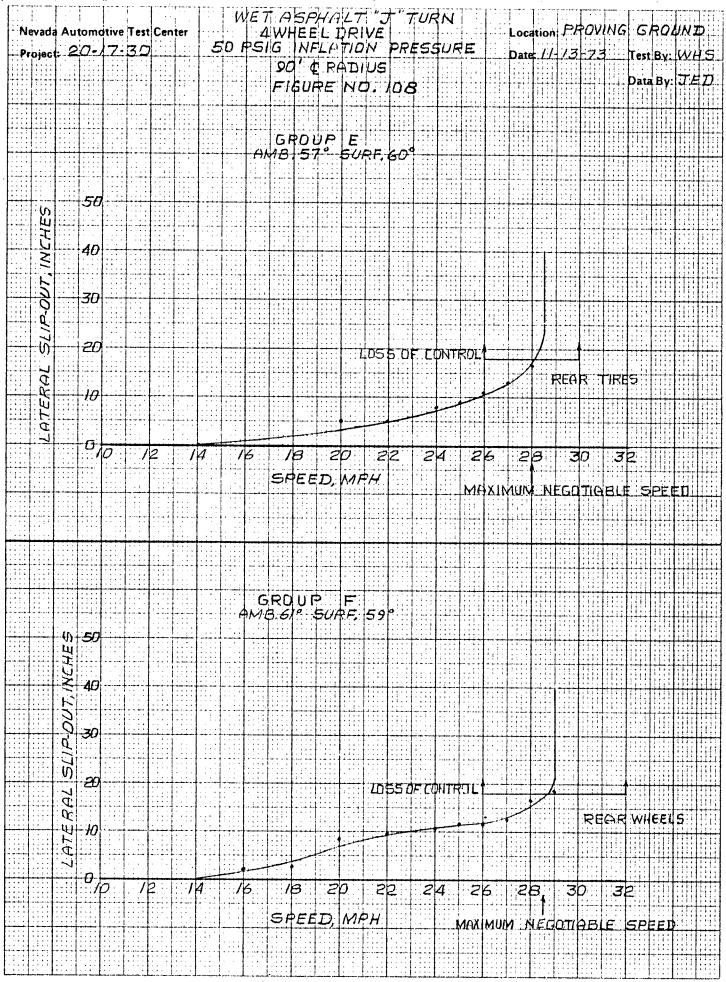
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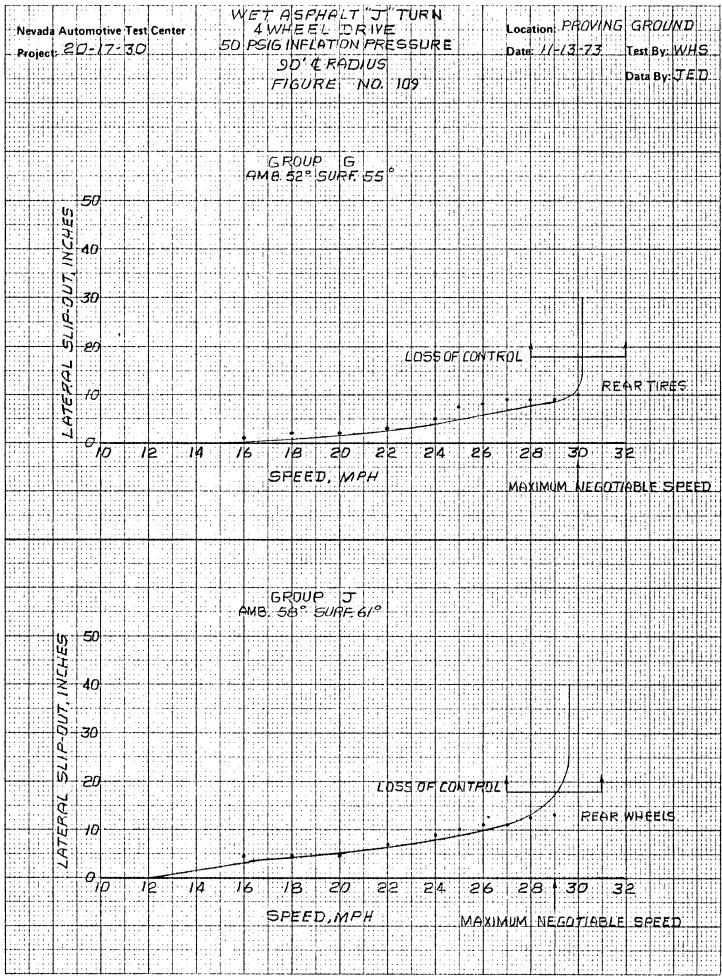
Figure Nos. 106 through 109

"J" Turns - Wet Asphalt





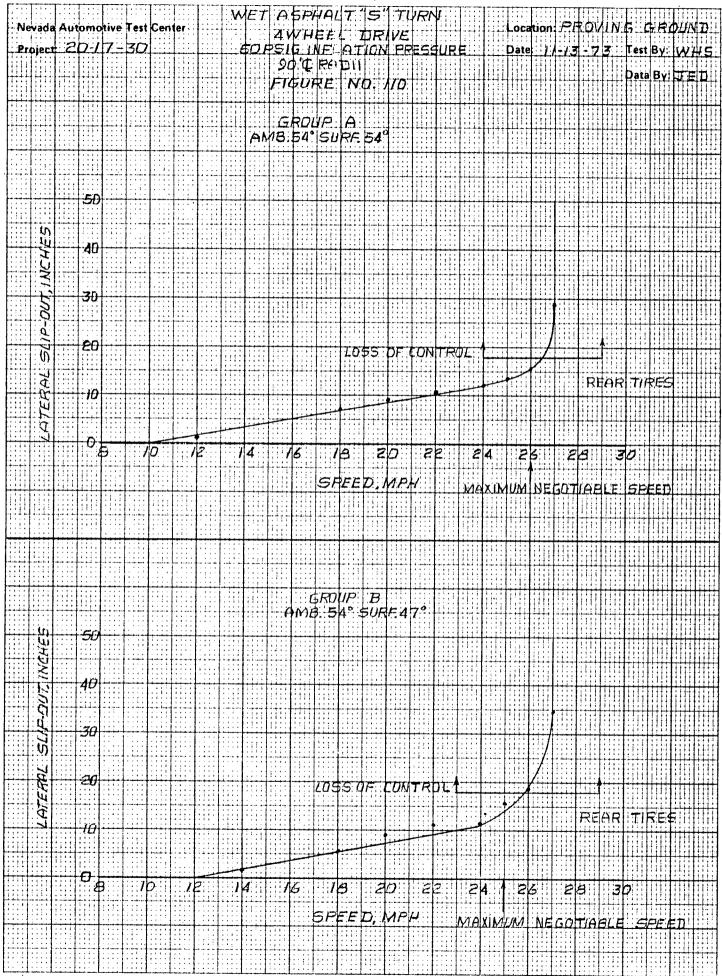


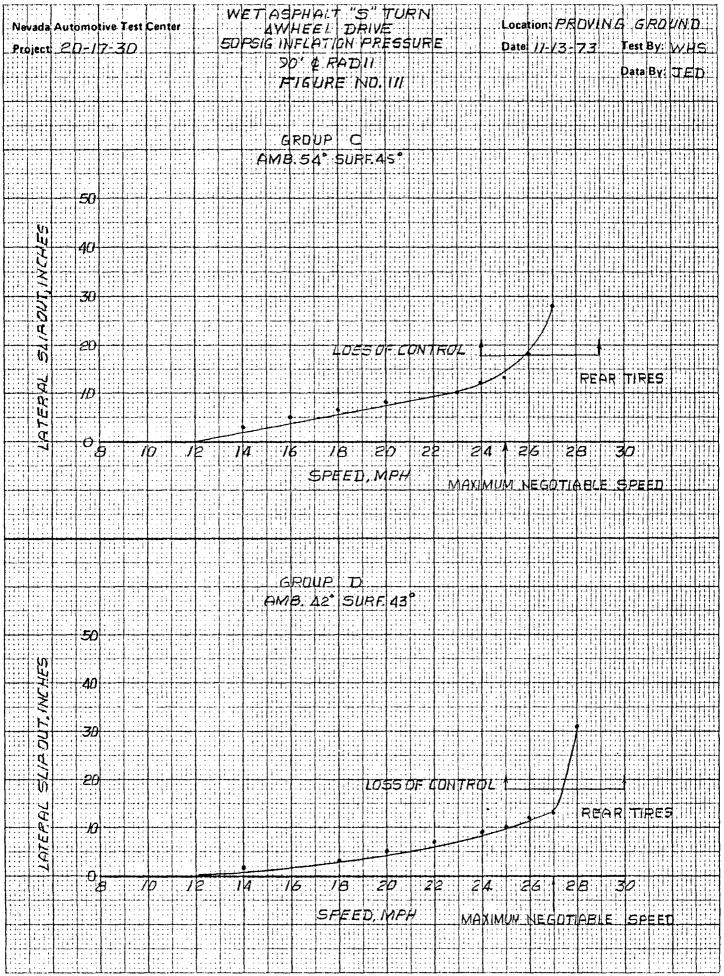


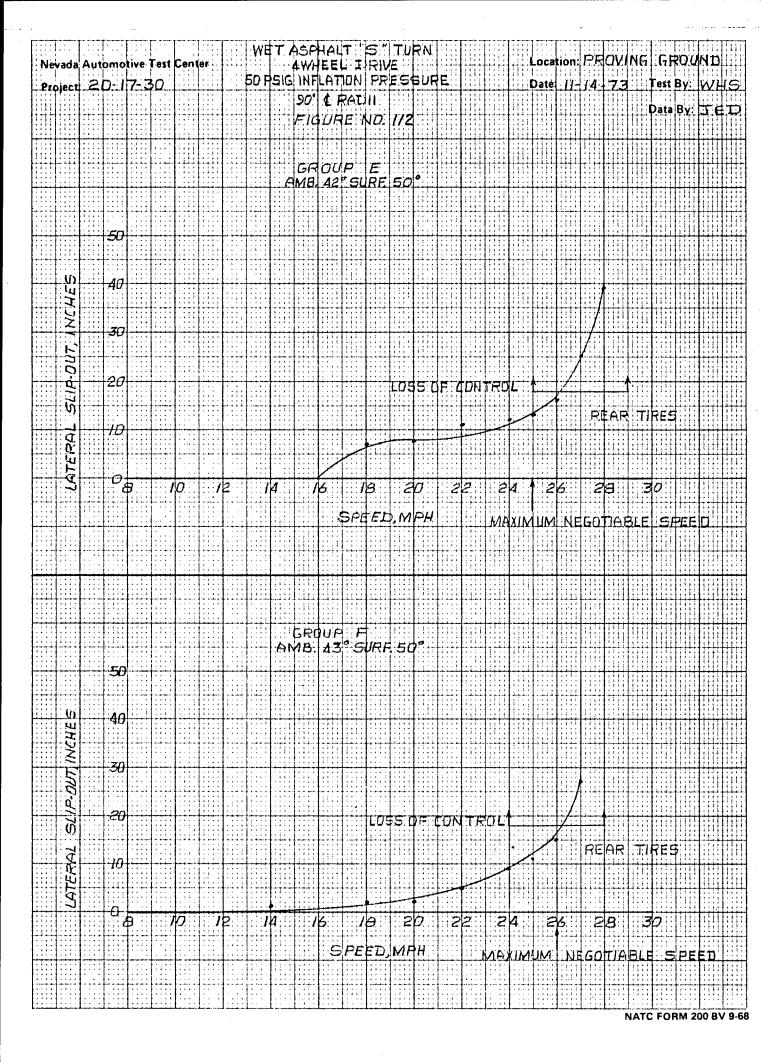
TEST DATA

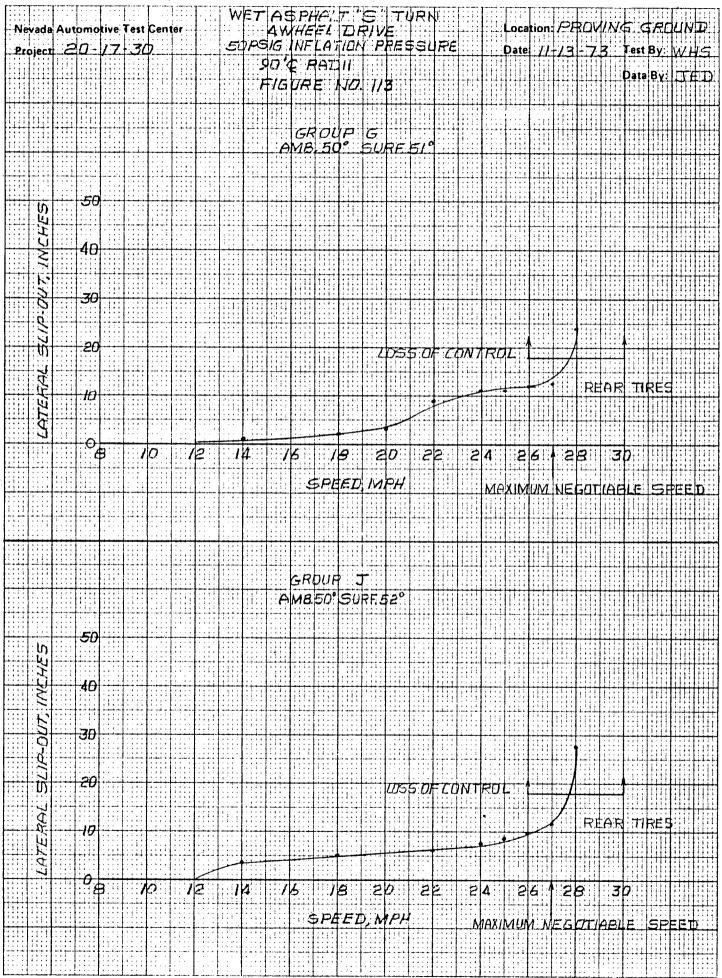
Figure Nos. 110 through 113

"S" Turns - Wet Asphalt









APPENDIX I
Soil Analysis



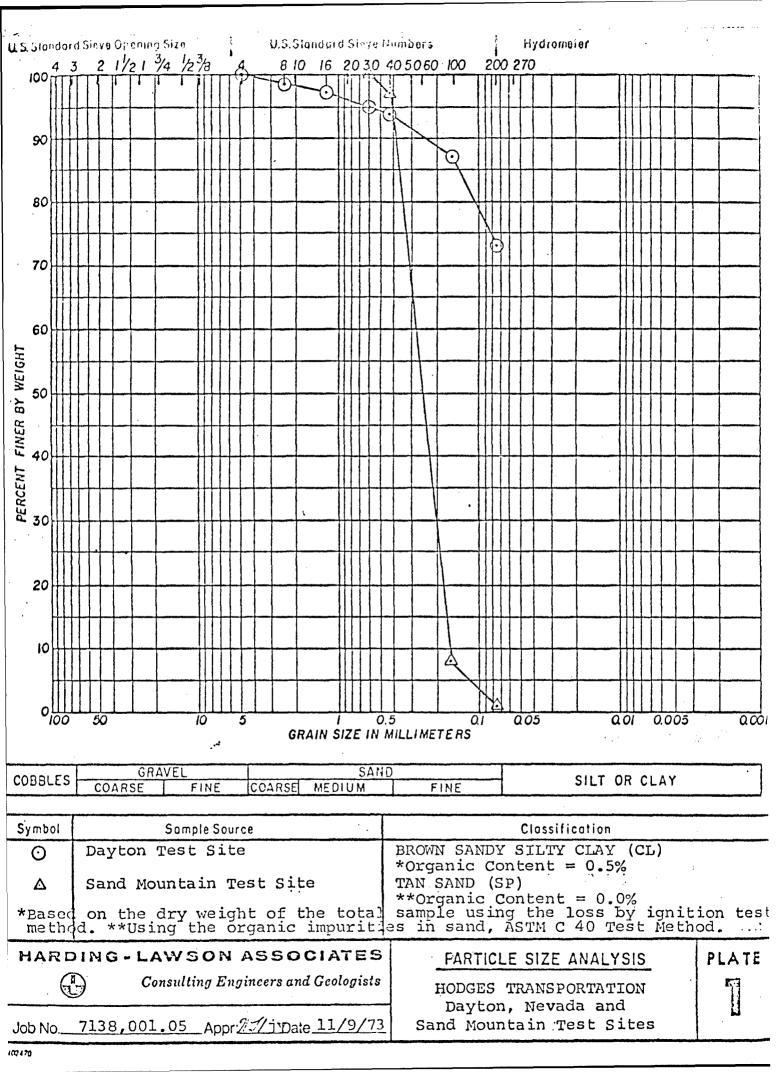
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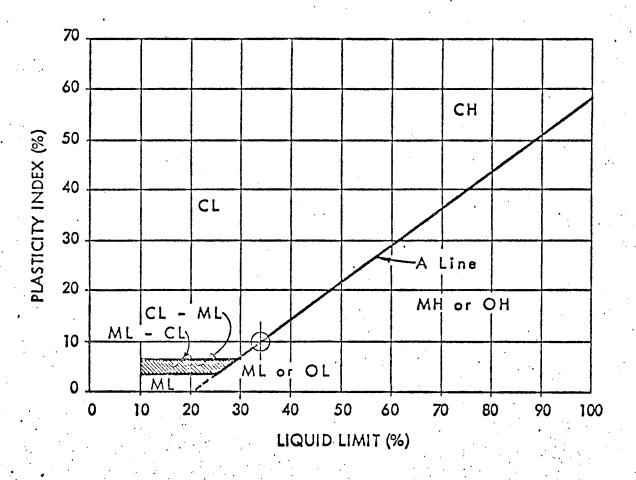
Consulting Engineers and Geologists

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TO:	Hodges Transportation, Inc.
	P. O. Box 234
	Carson City, Nevada 89701
ATTENTI	ON: Mr. Robert Torp
SUBJECT	Test Data for Dayton, Nevada and Sand Mt. Test Sites
OUR JOB	NO. 7138,001.05; Hodges Transportation Project No. 20-17-30
Transmitte	ed herewith iz/are the following:
Plate	1 - Particle Size Analysis (and organic content) for samples from
	n, Nevada and Sand Mt. Test Sites; Plate 2 - Plasticity Chart ample from Dayton Test Site; Plate 3 - Field Moisture-Density and
•	ded Triaxial Compression Test Data, for samples from Dayton
Test S	Site.
X Y	our use and need not be returned.
□ Y	our use; please return them when you have finished.
□ Y	our review; please return them with your comments.
-	
	HARDING - LAWSON ASSOCIATES
cc:	By Ken Till
	Date November 7, 1973

LETTER OF TRANSMITTAL





Symbol	Classification and Source	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	% Passing #200 Sieve
Φ	BROWN SANDY SILTY CLAY (CL) Dayton Test Site	33.5	23.5	10.0	73
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HARDING-LAWSON ASSOCIATES

Consulting Engineers and Geologists

Job No. 7138,001.05 Appr. 21/9/73

PLASTICITY CHART

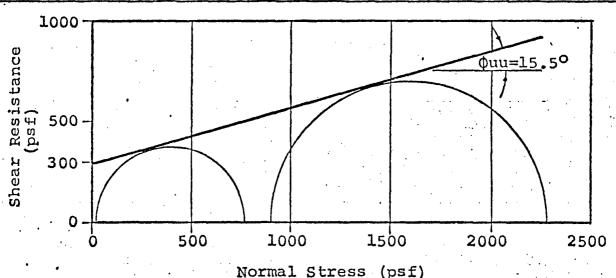
HODGES TRANSPORTATION Test Site Near Dayton, Nevada PLATE



	FIELD SAMELE	MOLGMUNG o imes order 1.0 M / T.		,
Sample	Classification	Moisture Content Percent (%)	Dry Density (pcf)	Average Dry Density (pcf)
A*	BROWN SANDY SILTY CLAY (CL)	33.1	85	85.5
В*	BROWN SANDY SILTY CLAY (CL)	33.3	86	03.3

^{*}Samples obtained from Dayton, Nevada Test Site when they were watered to near liquid condition on October 25, 1973.

REMOLDED TRIAXIAL COMPRESSION (Unconsolidated-Undrained) TEST RESULTS



Moisture Dry Confining 1/2 Deviator Content Density Stress Stress Sample Classification (pcf) (%)(psf) (psf) BROWN SANDY SILTY 23.9 C 85 381 CLAY (CL) BROWN SANDY SILTY 23.8 864 85 711 D CLAY (CL)

The above triaxial compression test results show that, for the unconsolidated-undrained condition, samples remolded to near the plastic limit moisture content (23.5%, about 68% saturation) and to near the dry density of the field samples A and B have an angle of internal friction (shearing resistance) = $\dot{\phi}$ = 15.5 degrees and C-value for undrained shear = 300 psf.

HARDING-LAWSON ASS	OCIATES
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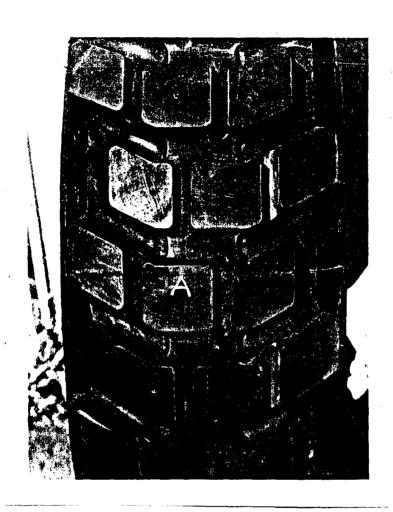
FIELD MOISTURE - DENSITY AND REMOLDED TRIXXIAL COMPRESSION TEST RESULTS

PLATE

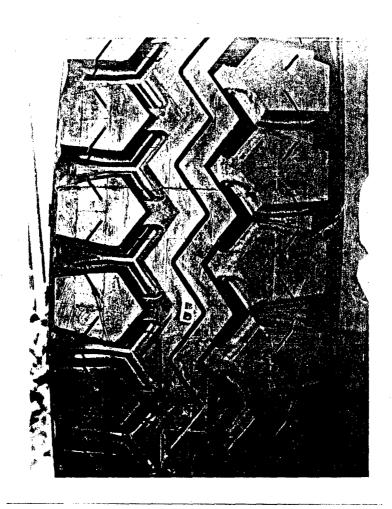


Appendix II

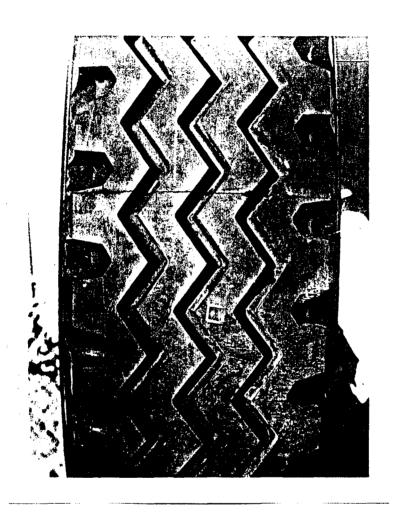
Photographic Supplement



GROUP A
Tread Pattern

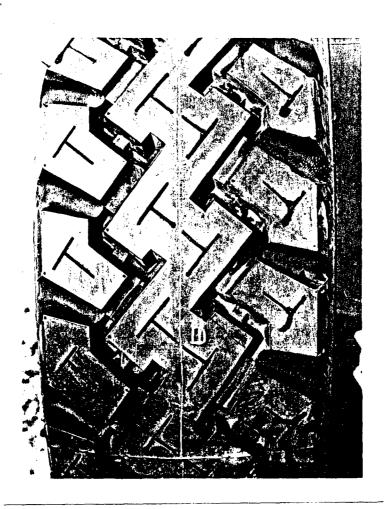


GROUP B
Tread Pattern



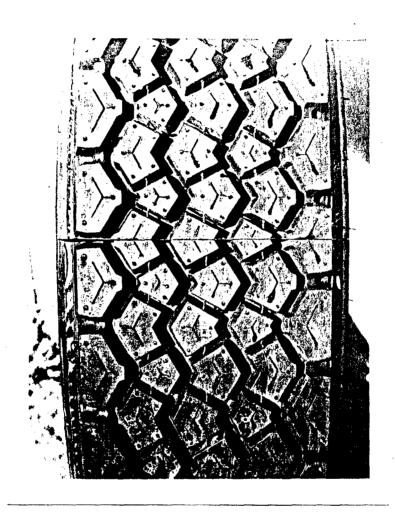
GROUP C

Tread Pattern



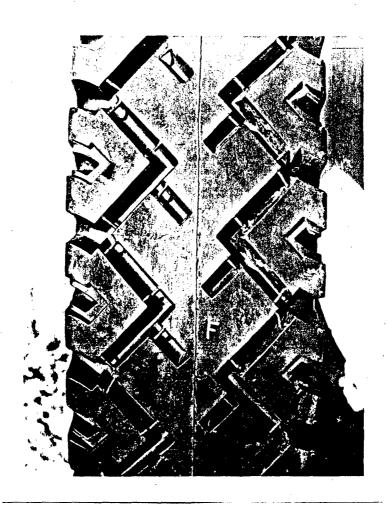
GROUP D

Tread Pattern



GROUP E

Tread Pattern

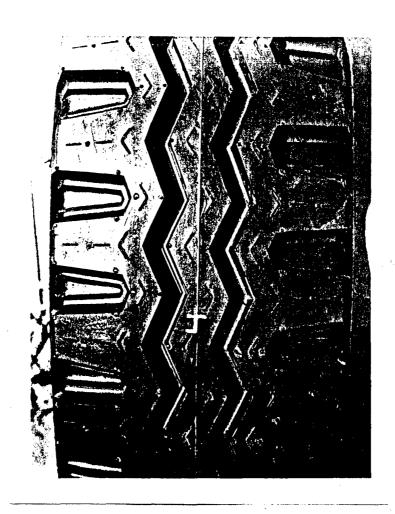


GROUP F
Tread Pattern



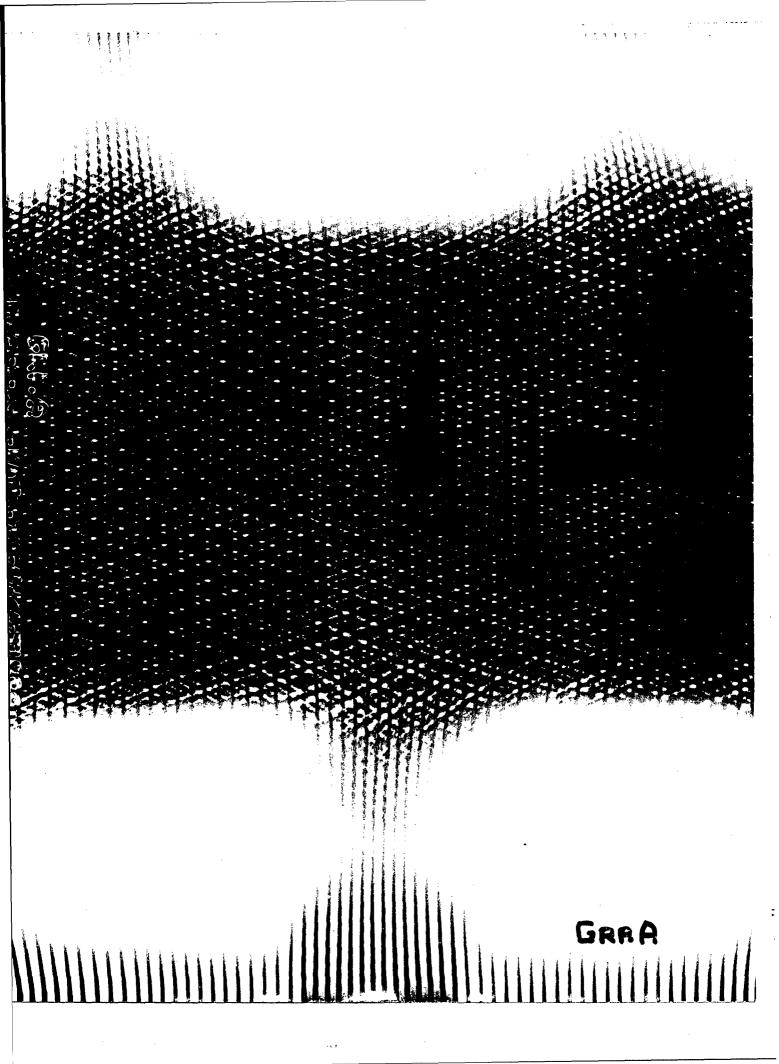
GROUP G

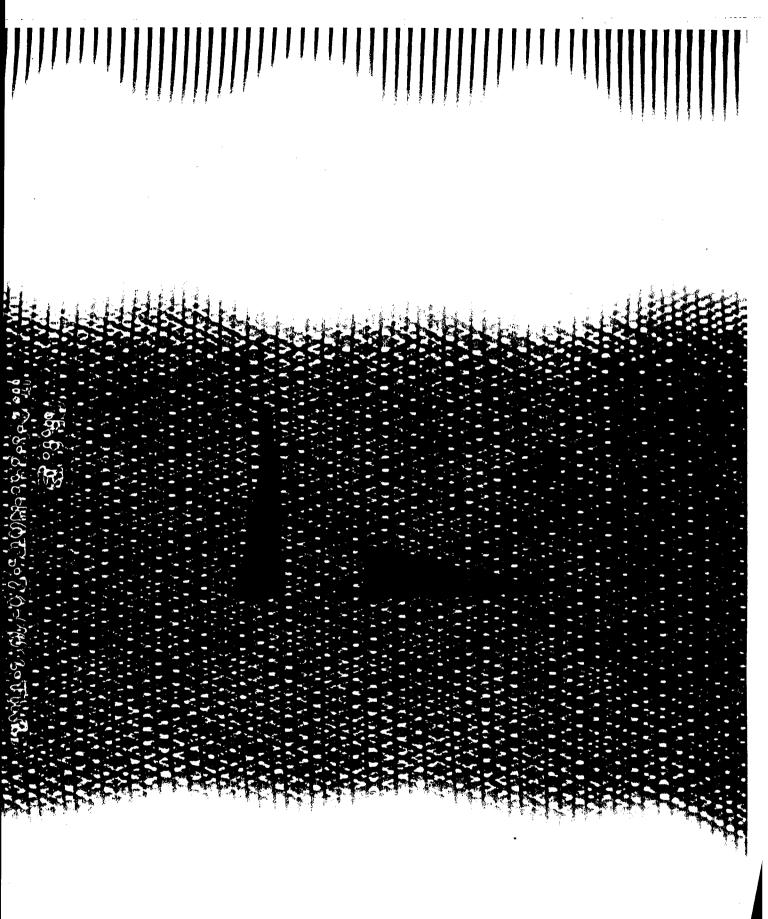
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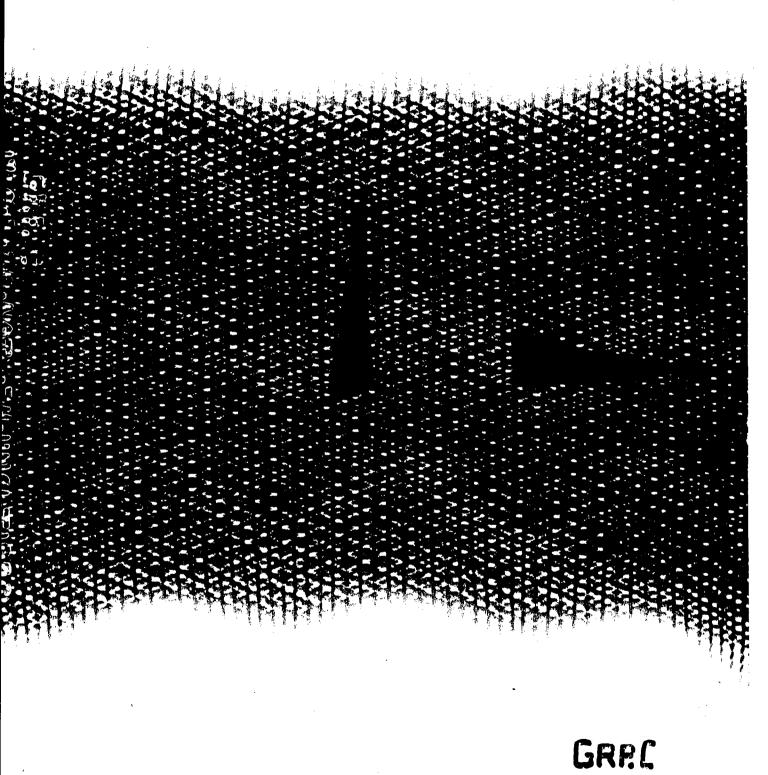
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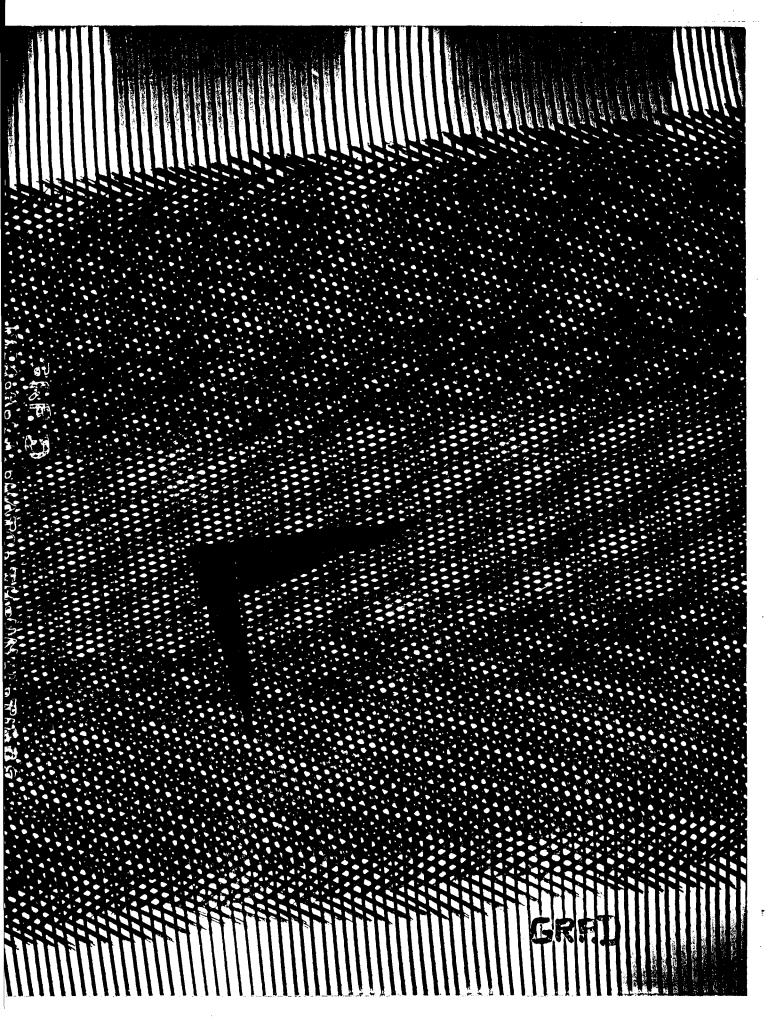
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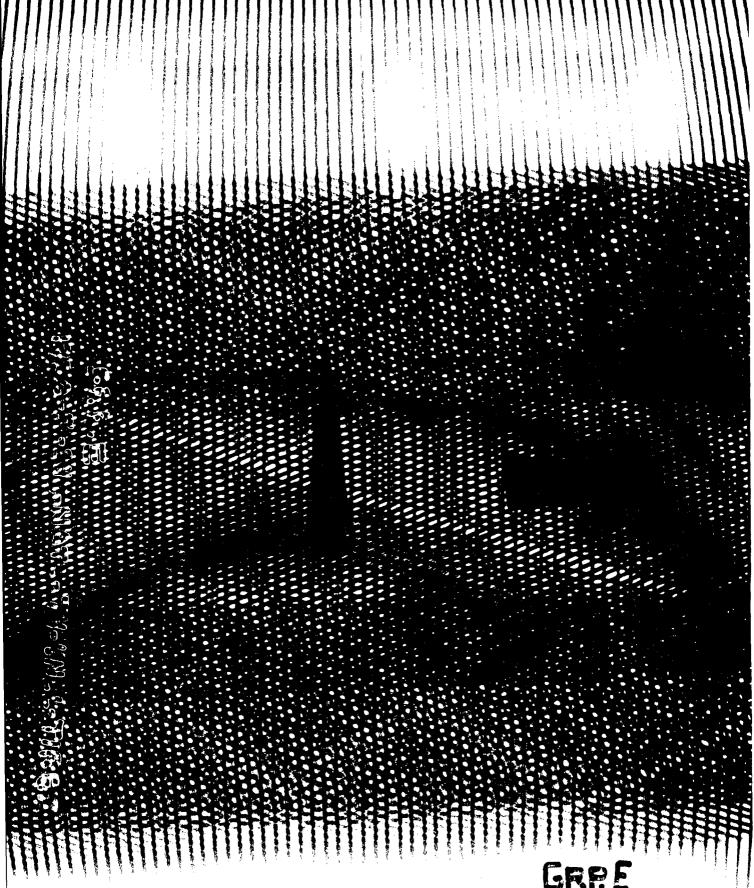




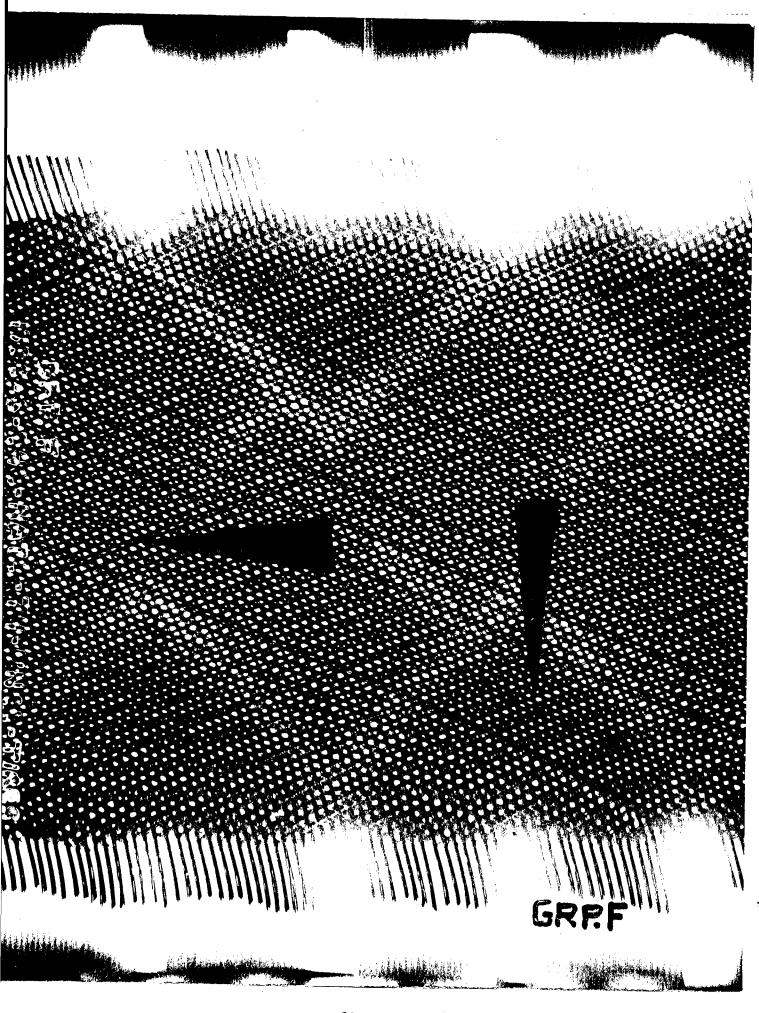
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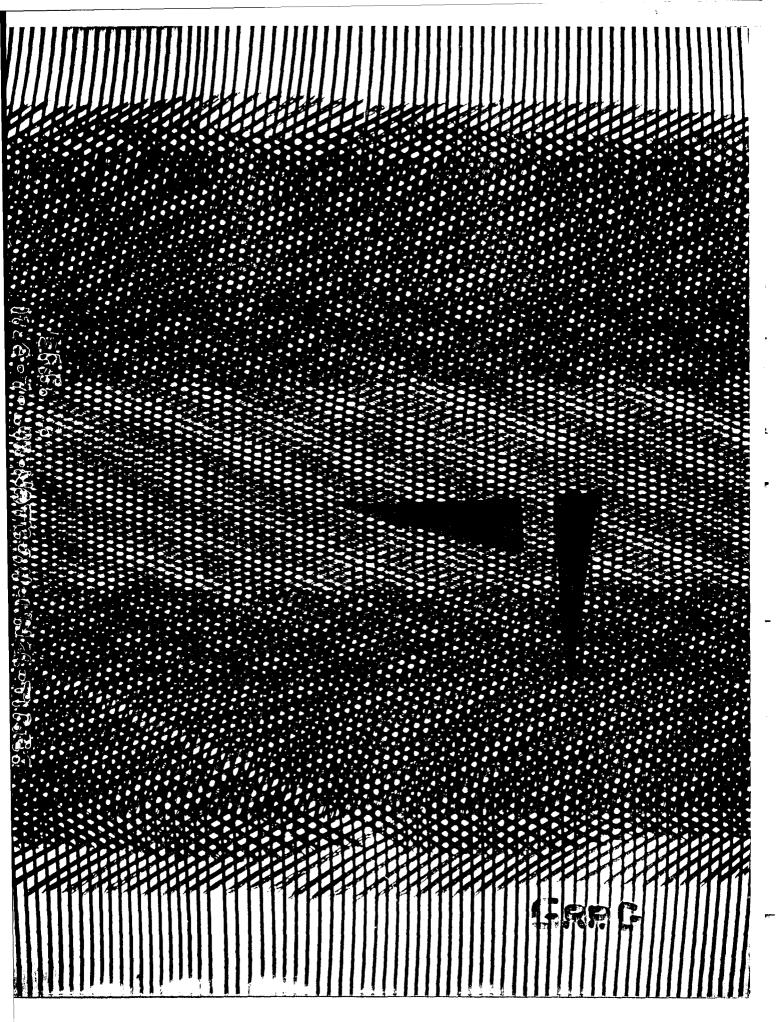


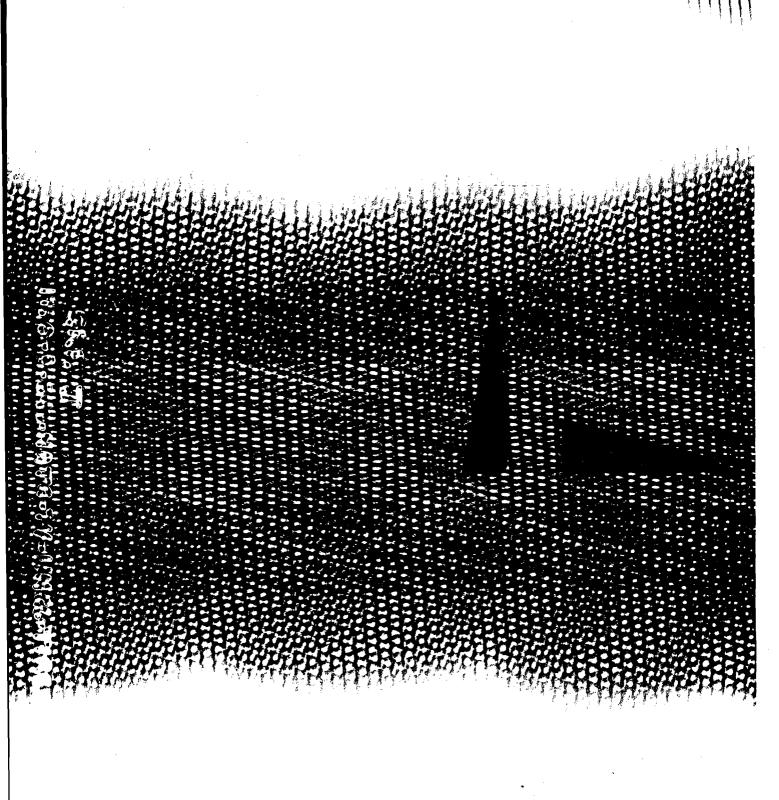




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U.S. Army Tank Automotive Command

13. ABSTRACT

The report of Tread Design Study of 9.00R20 Radial Ply Tires is published to disseminate the detailed data and results of a test of eight groups of 9.00R20 tires that were considered to be candidates for military use. Two of the tire groups were radial ply tire carcasses that were retreaded with a TACOM proposed tread design. The data sources were engineering tests performed by Nevada Automotive Test Center at its test facilities.

The analysis methodology used was direct comparison of test results which were combined in rank order by level of comparative performance.

Key Words

Radial Tires
Sand Mobility
Traction
Braking

Mud Mobility
Rolling Resistance
Retreaded Tires
Steel Belted Tires
Ply Rating

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